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VOL. 25 APRIL 1959

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## Slide Rule

VOLUME 25

APRIL, 1959

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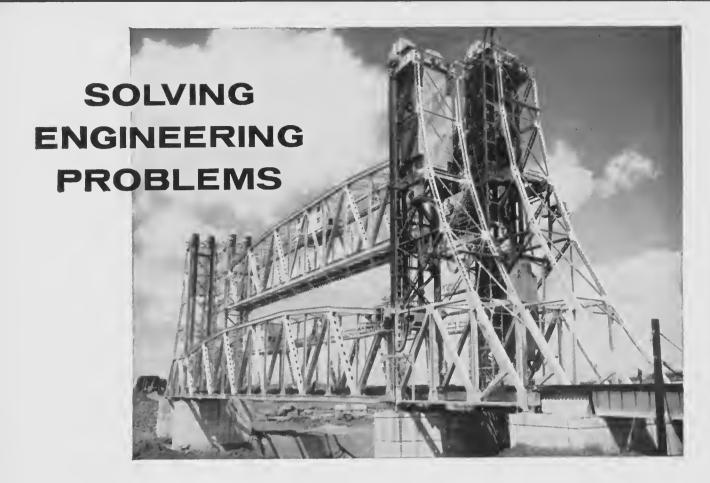
COVER PHOTO — The crane used on the construction of United College's new wing.

-by EGON STANIK.

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#### Centre:

This catenary ore bin for Consolidated Denison Mines Limited has a capacity of 15,000 tons. The steelwork weighs 1,000 tons.

#### Bottom:

Iroquois Lock, showing one of six pairs of steel sector gates built for the St. Lawrence Seaway. Resembling a huge wedge of cake, each gate is 43 ft. high and weighs 250 tons.

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Magazine Section



I AM AN ENGINEER. In my profession I toke deep pride, but without vain glory; to it I owe solemn abligations that I am eager to fulfill.

As an Engineer, I will participate in none but honest enterprise. To him that has engaged my services, os employer or client, I will give the utmost of performance and fidelity.

When needed, my skill ond knowledge shall be given without reservation for the public good. From special capacity springs the obligation to use it well in the service of humonity; and I accept the chollenge that this implies.

Jealaus of the high repute of my colling, I will strive to protect the interests and the good name of ony engineer that I know to be deserving; but I will not shrink, should duty dictate, from disclosing the truth regarding onyane that, by unscrupulous act, has shown himself unworthy of the profession.

Since the Age of Stone, human progress hos been conditioned by the genius af my professional farbears. By them hove been rendered usable ta mankind Nature's vast resources of materiol and energy. By them hove been vitalized and turned ta practical account the principles af science and the revelations of technology. Except for this heritage of occumulated experience, my efforts would be feeble. I dedicate myself to the dissemination of engineering knowledge, and, especially, to the instruction af younger members of my profession in all its orts and traditions.

To my fellows I pledge, in the some full meosure I ask of them, integrity and fair dealing, toleronce and respect, and devatian to the standards and the dignity of our profession; with the consciousness, always, that our special expertness carries with it the obligation to serve humanity with complete sincerity.

# THE NEXT

BY

DR. A. E. Macdanald, B.Sc., M.Sc., D. Eng., M.E.I.C., P. Eng.

Dean of the Faculty of Engineering and Architecture



Dr. A. E. Macdanald

#### THE COMING CRISIS

Based upon figures of early 1940 birth rates, far same years naw it has been statistically evident that, in the near future, there will be an ever-increasing enralment at universities across Canada, the estimate approaching nearly dauble the present registration by ten years hence. One need anly observe the extent of additions to existing school buildings and pragress in the constructian af new schools to realize that, on the conservative basis of the projection of the same percentage of high school students going an to university, the tatal number at universities will be greatly increased. Although the percentage of this entering total to choose engineering is unknown, it seems reasonable to assume that registration in engineering also will nearly dauble in the same periad.

Bath the federal and pravincial governments have been well aware of this approaching crisis in higher education and are assisting materially in meeting the resulting financial prablems invalved. With the advent of Sputnik, and now the casmic rocket Mechta, a stronger case than ever can be made in support of the needs of higher education, in order that Canada may keep pace with scientific developments and their side effects.

"Industrial Topics" for December, 1958, issued by the Industrial Development Baard of Greater Winnipeg, shaws a fine layaut af our university's expansian, and gives the present enralment figure af appraximately 6,000, the estimated figure af 10,000 by 1968, and that of 15,000 by the centenary date af 1977. Current canstruction, completed

canstructian, and future canstructian are nated but, except far a phatagraph of the new narth wing af the Engineering Building, which was completed and accupied in the fall of 1949, na mentian is made of present and future developments in this area of high learning. This article then is an attempt briefly to span that gap far the relatively foreseeable period of five years.

#### **ENROLMENT INCREASE**

For engineering, an the basis af aur tatal registration af 845 as af last Octaber, the enralment five years hence is estimated at 1300 in raund numbers. What it will actually be at that time will have to be left until then ta determine, but an intelligent estimate must be made naw and this figure used in arder ta plan ahead and have trained teaching staff and physical plant available then. Such things do not appear, ar spring up, avernight.

#### STAFF EXPANSION

Additional teaching staff must be saught and trained in advance of the expected additional student numbers, if there is to be a smooth transition as classes increase in size and more sections of controllable numbers are to be met. In Ontaria universities, for example, with new faculties in Carleton, Mc-Master, Western Ontaria, Sherbroake, Essex and Sudbury, at various stages of offering the degree in same branches of engineering, the distribution of all available teaching personnel may be spread rather thinly. There should be many good appartunities for those current students, who have the necessary

mental capacity to benefit from post-graduate studies, to find teaching and research positions in universities both interesting os well as remunerative.

Such post-graduote studies here are being exponded. As of lost October, there were 22 students registered therefor in the three deportments of Civil, Electrical and Mechanical, Engineering and it is expected that this number will increase in, at least, the same ratio as the number in undergroduate courses.

But the teoching-staff to graduate-student ratio must necessorily be a great deal larger figure than that of teaching-staff to undergroduate-students, which still further aggravates the problem of finding immediately, in sufficient numbers, properly qualified teaching personnel. However, such personnel must be found.

#### **CURRICULA CHANGES**

Revisions of the engineering curriculo are constantly under review and minor and major changes are made from time to time. At the present time, there is a general trend toword more of the fundamentols, or basic sciences ond mothemotics, at the expense of the techniques, in view of our rapidly chonging technology. The argument odvonced is that an acceptable technique, which is tought when o student is attending university, may be dropped entirely or revised in practice by the time the student groduates, whereos the fundomentals will generolly remain the some.

It is claimed by some that industry can teach the techniques foster and better than can the university teaching stoff. Be that os it moy, sound judgment must be used when considering any proposed reduction in the applied subjects of the curricula, and curricula changes initioted by the larger faculties of universities in the more highly industrialized centres should not be heedlessly copied without due consideration of the obvious fact that a young graduote of such a university has opportunities for close-in procticol experience in industry, whereas an engineering graduate from o university in on ogricultural economy, such as ours, must be so trained that he can apply his course work immediately.

For instance, the young graduate town engineer in western Conodo moy be colled upon to design, lay-out and supervise, mony construction jobs before he con acquire little or any ofter-groduation practical experience. Nor is the argument convincing that o good grounding in the fundomentols olone would give him all the troining needed. Has onyone yet heord of a person being able to swim the first time he found himself in the woter, mere-

ly through hoving read beforehond the appropriate page in the instruction manual?

We are trying to find a happy balonce between the mathemotics, olong with the bosic sciences, and their practical applications so that our graduotes con be "going concerns" shortly following graduation. It is true that our curriculo are veering toward more of the fundamentals, but the so-colled practical subjects ore not being lost sight of, nor are those in the humanistic-social field. The attempt is to maintoin o good balance between the "know why" and the "know how," otherwise an honours science rather than on engineering course is indicoted. The toxpoyer is concerned when his bridges foll down or his electricity fails.

#### **NEW COURSES**

To diversify the choice of courses and meet the student demand therefor, it is hoped that it will be possible in the not too distant future, to offer at Manitoba a degree course in Mining Engineering as well as one in Chemical Engineering. Initially, there will be needed in each case the establishment of a departmental choir, with a minimum of staff, together with the construction of o loborotory building.

#### PLANT EXPANSION

If we are to have o marked increose in enrolment ond a marked addition to the teaching staff, along with the necessary clerical assistance, we must hove the physicol plont in which to house them. As is now well known, we were fortunate in having a two-storey addition built over our moterials testing loborotory extension and a one-storey extension added to our mechonical engineering laborotory last summer and occupied at the opening of the present session. This additional floor space was urgently needed to replace some unsuitable existing space as well as to accommodate larger closses of current students.

What is now needed immediately is a two-storey addition over the new mechanical engineering laboratory extension. As well, we should like to hove the orchitects proceeding with the plons for a new L-shoped extension to the north wing of the Engineering Building, to extend to the west ond then turn a right-angle and continue south in line with the present high voltage laboratory. We think that such on addition ond extension will be necessory to accommodate the estimated large student enrolment in engineering which is anticipated by the end of the five-year period or certainly by shortly thereofter.

With these odditions, the present Engineering Building will be expanded about to its limit, and the proposed laboratory building far each af mining ond chemical engineering will have to be locoted elsewhere on the campus as will any other future engineering buildings.

With a trained librorian in charge, we hope to have our engineering library space officially recognized as a branch of the main librory of the university ond exponded to occupy the present draughting room directly across the corridor.

#### FROM TECHNIQUES TO CULTURE

If aur hapes ore realized, some of the present first year engineering students will see them coming into being by the time they groduate. Same af those who will groduate this year may be returning for post-groduate caurses and should see their beginnings. Most af you will be experiencing revisions of the curricula, which are meant to offer aur students the very best in engineering education.

However, it would seem that, no matter how much thought and time may be spent an improving curricula, it is impassible to please oll graduotes. Mr. J. W. Barker, one time president of the American Society of Mechanical Engineers, has said that most engineers up to 5 years out af university camploin that their curriculum was not practical enough; from 5 to 15 years out af university, it was not thearetical enaugh; from 15 to 25 years, it should have contoined more writing and speech troining; and 25 ond more, it did not contoin enaugh generol culture.

Surely it is evident that oll your professors con do is ta give you the keys ta apen many doors. It is up ta yau to pass through with sustained initiative and mativation to develop as demonds require.

Take time to think, it is the source of power;
Take time to ploy, it is the secret of perpetual yauth;
Take time to read, it is the fountain of wisdam;
Take time to lave and be loved, it is o God-given
privilege:

Take time to be friendly, it is the raad to happiness; Take time to laugh, it is the music of the soul; Take time to give, it is too short o day to be selfish; Toke time to work, it is the price of success.

---ANON.

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# A GREETING FROM THE ASSOCIATION OF PROFESSIONAL ENGINEERS AND THE E.I.C.

By W. L. WARDROP, P.Eng.

President, Association of Professional Engineers of the Province of Monitobo, Chairman, Winnipeg Branch of the Engineering Institute of Conado.

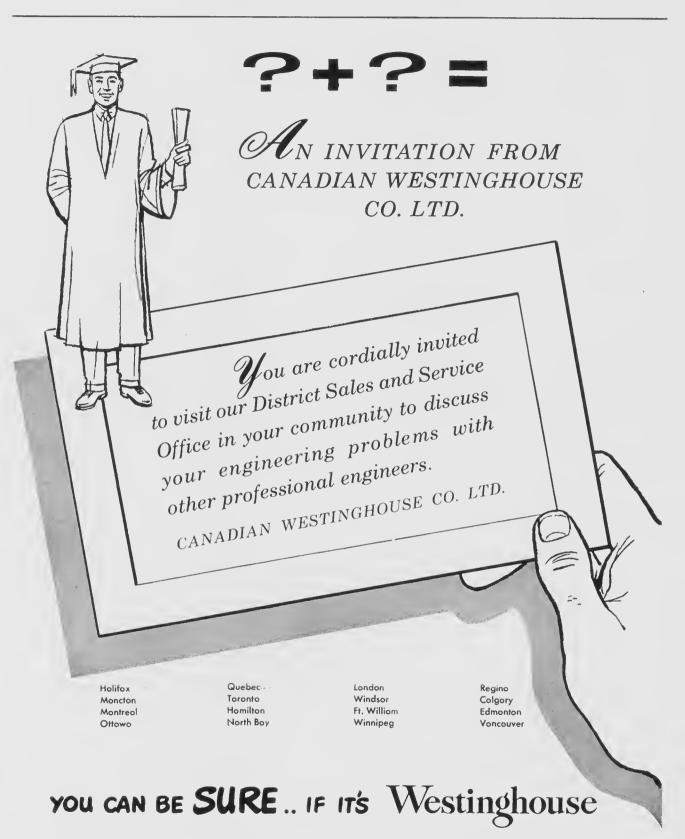
On beholf of the Associotion of Professional Engineers of the Province of Monitobo and the Winnipeg Branch of the Engineering Institute of Conado, it is my pleasure to extend greetings to the Engineering Student Body.

In o few short weeks our Profession will be strengthened by o new group of engineers — the Groduoting Closs of 1959. We ore especially interested in the groduoting closses because, in years to come, it will be the young engineers of todoy who will hove o great influence on the shope of things in this land of ours; young engineers like yourselves, who todoy have ocquired the technical background so essential for the successful implementation of engineering programmes which will open up and develop the new boundaries that lie ohead of us.

Unfortunotely, too much emphosis is sometimes ploced on whot we con get out of our Profession. Instead, we should be thinking of whot we con contribute to our Profession. As a member of the 1959 Graduoting Closs, you could make your first contribution by deciding

to enhance your position in the Profession through octive porticipation in the Engineering Institute of Conodo. By octive porticipation, I meon ottending meetings of which technical popers ore presented, and ot the earliest opportunity, to prepore ond present o poper of your own. There is no better woy to odvonce your own knowledge ond your professional status than to import knowledge to your fellow engineers. Your next contribution con be mode when you have goined the requisite omount of procticol troining which entitles you to be known os o Professional Engineer. It will be your privilege then, to stond side by side with other Professional Engineers to plan and execute engineering works, which will be to the losting benefit of monkind everywhere. It is only by stonding together that we con strengthen our Profession; not merely by numbers but through the enrichment of on heritoge of occumulated experience. This is your obligotion and I, with all humility and sincerity, osk you to occept it well.

Moy you oll enjoy success in your coming exominations and in your professional coreers ohead.



### A Few Words from . . .

# THE HONORARY PRESIDENT OF THE U.M.E.S.

BY

AIR COMMODORE H. H. C. RUTLEDGE

Group Commander, 14 Training Group, R.C.A.F. Honorary President, University of Manitoba Engineering Society



Air Commodore Rutledge

In these days of unprecedented discovery and invention, there seems to be interwoven in the fabric of our progress an uncomfortable sense of urgency in drawing notice to the fact that wisdom is not keeping pace with achievement. We have attained a position where our handiwork can supply practically all our needs except security. Our achievements provide us with knowledge, machines and materials beyond the fondest dreams of man a century ago, but also have inherent within them the power of unparalleled destruction, if not finite doom. The gulf separating man from his past has widened from generation to generation and finally from decade to decade. Can the principles of behaviour which insured survival in a comparatively stable past still suffice amid the rapid change peculiar to our day? It is upon this point that the urgency of our anxiety seems to centre and we pause to focus our attention, not on the magnitude of our inventions or the extent of our progress, but on our relationship to them in the matter of control.

Man has come to the place where he has had to ask himself if he is the master or the slave. One day calls for a review of man's behaviour patterns, a re-assessment of his principles, his beliefs, and his goals. The

anxiety inherent in the mind of modern man underscores this need. He mistrusts the ability of former behaviour patterns to cope with his present problems. Fifty years ago, a man under the influence of alcohol, asleep in his buggy and transported home by his faithful horse was a comparatively innocent incident. A man today under the same influence, behind the wheel of a powerful modern car, is a different approach. Smoking may be generally looked upon today as an innocent and common habit, but an employee indulging in the same habit where nitroglycerine is manufactured is classed as a fool and a criminal. Changing times and circumstances make demands upon us for changes in behaviour and attitudes.

We have come to a time in which ideals and moral codes must be meticulously examined and followed. Circumstances do not allow for variation or default. This being so, man's most urgent problem and concern is man himself. He cannot afford to be primarily concerned about the things invented until he thoroughly understands the inventor. To the intelligent man his role is clear. He must so equip himself with knowledge and experience that he will have the wisdom and ability to see the

real issues af life clearly so that, rather than odd to the sacial canfusion, he will be equipped to lead and instruct.

To da this, mon must first understond himself. Inheriting a nature that tends to be at cross purposes with itself, this is not as simple as it may seem. Far even men of renawned intellgence are not always free of this problem.

In view of the almost unlimited power within his control, man's second problem is even greater and mare imperative than the first—"man must understond his fellow man." He must be able to stand where his neighbour stonds and understand how he, with a different background and personality, feels. In a ropidly shrinking world, this becomes daily more imperative if man is to survive.

Thirdly, and perhaps as difficult as the ather twa, man must overcame his selfishness because the events af aur day demond it. Mankind has became sa much ane family that we cannot ensure our own prasperity except by ensuring that of everyane else. If we wish ta enjay security and hoppiness, we must be willing that athers enjoy the same security and the same hoppiness. This then, is the urgency that is woven in the fabric of aur progress. It demands new ottitudes toward our respansibilities and o new concern for our fellaw mon.

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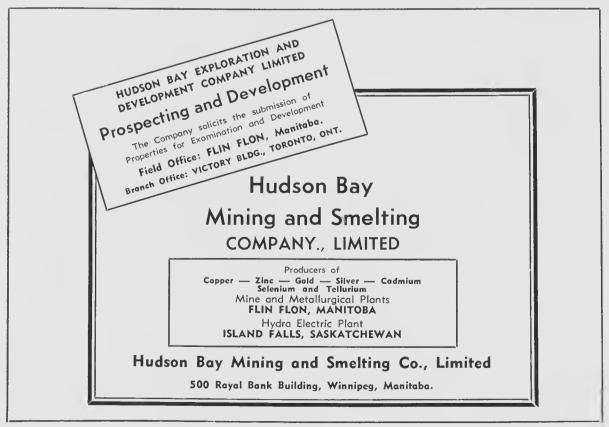
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# SOME THOUGHTS ON ENGINEERING EDUCATION

By PROF. E. BRIDGES, Faculty Advisor

The year 1957 launched not only a Sputnik but also almost as explosively "an era of great dependence on the scientist and the engineer". (1) The cold war has shifted from a weapons race to "a contest of total technologies or societies." This focusing of attention on the technologist has caused an intensive appraisal of the educational system producing him. A great debate on higher technical education has been raging for the past year with many articles on this subject appearing in journals, magazines and newspapers.

Let us first define what is meant by a "technologist," that is, what is his position in society and what is his work? A technologist is a person concerned with "the application of science to the needs of man and society." (2) The work categories of a technologist may be roughly split into the four groups of managerial, sales, general and specialized, engineering.

Let us next consider the classical undergraduate engineering educational system. Here, the aims are to lay a foundation of the related sciences, to acquaint the student with the resources of the humanities and social sciences and to provide a broad technical training in the classical fields of engineering with a comprehensive knowledge in one of these fields. The undergraduate school has produced engineers who qualify for most of the positions in the first three work categories and it has been left to the graduate school to supply the technical specialists. The above formula, bounded by existing conditions, has worked successfully in supplying society with qualified technologists and will continue to do so as long as the existing conditions are frequently considered.

What are these conditions? First there has been of late a phenomenal development in the sciences and applications of mathematics. This necessitates a strengthening in the foundation of related sciences.

Secondly we must bear in mind that the engineer is concerned with the "application of science to the needs of man and society, Therefore technology is inseparable from humanism. The technologist is up to his neck in human problems whether he likes it or not." (2) MacLeish has the following words of warning to American educators which are just as applicable in Canada:

"The argument for the revolutionary constructon of the American system of higher education to provide more specialists in technology and science is an argument based, of course, on the achievements of the Russians. That is, or is assumed to be, its strength in appropriation committees and town meetings. We must keep up with the Russians; we are damned if we don't. But the trouble is — and it is a trouble university faculties increasingly observe — that we are also damned if we do. To compete with the Russians — particularly to emulate them at the growing edge of our national life where the character of the next generation of Americans will be determinedis to model ourselves on the Russans; and to model ourselves on the Russians is to substitute State for Nation and to accept of our own choice precisely the fate we have been struggling to avoid."(3)

Engineering education must remain liberal and have an adequate humanities content. These are two points which are agreed upon by engineering educators.

It is the last point, the broad technical training, which is at issue. Present conditions are such that we are surrounded by a sea of technical knowledge. The classical engineering fields are expanding rapidly; new fields (such as nuclear engineering) are being created; there are combinations of branches



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of other fields such as electrical and mechanical to produce "control" engineering. With the time available it is impossible to impart a broad training in all fields and at the same time competence in any one field.

What then is the solution? Before I continue further I would like to quote Sir Eric Ashby from his address to the Institute of Metals when he said that "lectures on education are unlike lectures on metallurgy, for men have been thinking about education for over 2,000 years, and some of their thinking never becomes out of date. Anything worth saying has already frequently been said. Anything hitherto unsaid should be regarded with the greatest suspicion." $^{(2)}$ 

Let us then look to the past when science, confronted with the same problem, adopted the honours system of courses. Are we moving towards an honours system? This system would allow a general engineering course to be offered which would give the student a broad familiarization with the major technical fields. Qualified students then have the option of taking an honours course with comprehensive training in a specific field. The honours system would still carry a foundation of related sciences and the humanities but would substitute advanced technical knowledge in a single field for the more general technical knowledge in several, which is, at present, the existing situation in most Canadian Universities.

#### References:

- (1) D. W. Douglas, Space Science and Education Jaurnal of the Franklin Institute, 266, 431, 1958.
- (2) Sir Eric Ashby, Technalogical Humanism Jaurnal of the Institute of Electrical Engineers, 4, 478, 1958.
- (3) A. MacLeish, What is a True University, Soturday Review, Jonuary 31, 1959.

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# THE CONTROL OF AN AIRCRAFT IN FLIGHT

A Paper Submitted to the S.E.I.C. Papers Contest by

Richard Marantz IV E.

To analyze the motians of an aircraft in flight, a set of reference axes are chosen which pass through the centre of gravity of the aircraft, as illustrated in Fig. 1. The main body of this paper will be a detailed discussion of the aerodynamic forces which create the mations about these reference axes. The control surfaces, namely the elevatar, rudder, and ailerans produce the motions of roll, pitch, and yaw about the longitudinal, lateral, and normal axes as illustrated in Fig. 1.

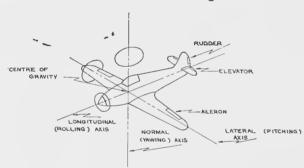


Fig. 1. Aircraft Reference Axes.

Before any movements about these reference axes can be discussed, some elementary aeradynamic theory on airfoils must be develaped.

An airfoil is a body which can praduce a useful aeradynamic force. Cansider the airfail ar wing illustrated in Fig. 2.

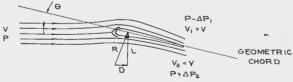


Fig. 2. Streamlines Around An Airfail.

As the airfail maves through the air with a velocity (V), the air adjacent to the leading edge is forced to separate and flow aver and under the airfail. Accarding to Bernoulli's equation, the energy along a stream line is constant. The air is accelerated over the top

of the airfoil, with the resulting decrease in pressure  $(P-\Delta P_1)$  and increase in velocity  $(V_1>V)$ , as illustrated in Fig. 2. The air flowing beneath the airfoil is decelerated with a resulting increase in pressure  $(P + \triangle P_2)$ . and decrease in velocty ( $\dot{V}_2 < V$ ). This sets up a pressure differential between the upper and lower portions of the airfoil, which produces the resulting aerodynamic force R illustrated in Fig. 2. The vector R can be broken down into its horizantal component D(DRAG) and vertical camponent L(LIFT). As a point of interest  $\triangle P_1 = 3 \triangle P_2$ . This means that from twa to three times as much aeradynamic farce results fram the tap surface action, as from the bottom surface of the airfoil. The geametric chard by definition is a line extending from the leading edge of the airfoil to the trailing edge, as illustrated in Fig. 2. The inclinatian of this geometric chord to the direction of the undisturbed airflow, ar line of flight is called the angle of attack. (6).

If a graph is platted with L(LIFT) as ordinate and  $\emptyset$ (ANGLE OF ATTACK) as abscissa the result is approximated by the illustration in Fig. 3.

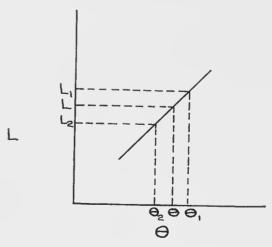


Fig. 3. Lift-Angle of Attack Graph.

This groph shaws that for increasing ongles af attack, the lift an the airfoil increases. Likewise for decreasing ongles af attack the lift an the oirfail decreases.

In generol, mast manoeuvers of the contrals oppeor to be cantrory to camman sense. As on example, the forces octing an the orcroft to produce o turn will be analyzed. The aircroft is not turned by rudder! The proper method of turning on aircroft is by bonking or rolling it obout the langitudinal axis.

After the oircroft hos been rolled about the langitudinol axis, it ossumes the position illustrated in Fig. 4.

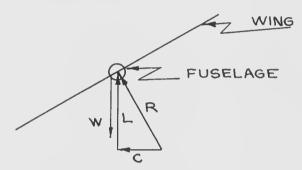


Fig. 4. Forces an an Aircraft in a Turn.

The resultant oerodyomic farce R always octs at right ongles to the wings. The vectar R can be braken dawn into twa campanents, vectar L which sustains the weight of the oircroft W, and vector C, a harizantal unbalanced force which pushes the oircraft through the turn.

The aircroft is ralled obaut the langitudinol oxis by the aileron cantrol surfoces. Cansider o crass sectional view of the right ond left

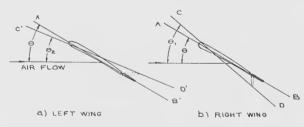


Fig. 5. Aileran Cantral in a Turn.

wings, in the pracess of being banked to the left, os illustrated in Fig. 5.

Ta make the right wing rise, the lift on the wing must be increosed. Ta increose the right wing rise, the lift on the wing must be increased. Ta increase the lift, the ongle of attack must be increosed. This is dane by maving the oileron cantral surfoce dawnword to the datted position illustrated in Fig. 5b. The geometric chord is chonged from the position A-B to C-D, which increoses the ongle of ottock from  $\emptyset$  to  $\emptyset$ . Returning to Fig. 3 the value of L<sub>1</sub> for  $\emptyset$ <sub>1</sub> is greater than L for  $\emptyset$ . With the increased lift the wing is roised. The same pracedure occurs on the left wing, except the oileron surfoce moves upword, resulting in a decreose in lift and o downword mavement of the wing.

Most simple oilerons hove a defect called odverse yow. If the oircraft is ralled to the left wing without opplying ony rudder control, the oircraft will force its nase to the right in the pracess of bonking to the left. The right aileron is farced downward into the denser airflaw beneoth the right wing, increasing the ongle of attack af the wing which increose the lift ond drog. The left oileran is farced upward into the less dense oirflaw aver the top surface of the wing, decreosing the ongle of attock of the wing and, correspondingly, the lift ond drag. The drog an the right wing is greater than the drag an the left wing, which tends to yow the oircroft in the appasite direction to which it is being bonked. To carrect far this defect, rudder control must be applied ta yow the aircroft bock to the left. This is the mojor reosan why the oeroplone has a rudder. The rudder is merely a device by which the oircroft caunterocts the adverse yow effect which is creoted by bonking the oircroft.

By proper design af the oileran cantral surfoces, the effect of odverse yow con be eliminoted. Professar Koppen af M.I.T. hos gone so far as ta soy "The anly purpase af the rudder is ta caver up the mistokes af the designer." Using this idea successfully, he has built rudderless aeraplones, which caardinote extremely well. The eliminotion af the rudder wauld simplify the art af flying, as the caordinotian of twa cantrals instead af three wauld be required to fly on oircroft.



# THE LAW OF INDETERMINABLE MOTIVATION OR

Stop Worrying WHY People Do Things . . . Just Make Sure They Do It and Do It Right

Ву

G. A. RUSSELL, Assoc. Prof. of Gealogy., P. Eng.

"Somehaw it has to be brought forcibly home to us that, camparatively, we are an indalent, pleosure seeking and soft section of humonity as apposed to the endlessly tailing, fonatical, ambitious and dedicated hardes in other lands who seek first to equal and then surposs the productive powers of the western world."

MR. JAMES MUIR, President and Chairman of the Board, Royal Bonk of Canado.

For several years naw the public in Canada ond the United States hos been ossoulted with a prapaganda campaign scarcely equolled in ony other part af the world. By means of press, rodio, television, weekly magazines and numeraus addresses by a wide voriety of citizens and politicions to booster clubs, chambers of cammerce and wamen's societies we have been told that things have never been os good as they ore now. The grass national praduct is soaring (so is alcohalism), individual incames ore way up (so are heart failures, coronaries and odmissions to mental hospitals and prisons), the stondord of living is the highest ever known (except in Athens 450 B.C.), and, in short, the rasy glow of prosperity ond national well being shines upon us all. There are, the 'experts' soy, same doubtful oreas (such as I hove mentioned in brackets obove) but certainly nothing to disturb the serenity of our existence. I would like to suggest that the widespread, and really rother ignorant, occeptance of the prasperity propogando is leading us dawn the hill towards the fote sa well described by Mr. Muir in the quotatian obove. I would like to suggest further that Mr. Muir omitted one other charocteristic of us as a notional graup. The cauntry is becoming increasingly divided inta cliques or groups — formers, lobour, management, gavernment, nan-aperators, shiftless unemployed, and white collor workers — all of whom are trying to get os much as they can for themselves without a single thought as to how the other groups may be affected.

I cannot see that our present task is one of sitting back ond viewing, with a rather benign, stupid grin, the elements af our notional life that we find to be in a satisfactory candition. Our chief concern today must certainly be with the things that are unsatisfoctory. How is it possible that we ever got into such a mess? I think there are two factors and both are concerned with the way in which we, as a notion, are thinking. When I say notion, I dan't mean just the political leaders or lobour leaders or business leaders. I mean all of us . . . the man in the street . . . the housewives . . . the old people, young people and middle-oged.

The swift advance of science and technology has created in the majarity of people, especially those who have not been troined in it, a feeling of amnipatence about science and the scientific methad. Science for a long time (since about 1300 A.D.) has been dominated by o way of thinking that if often described as Occom's Rozor. Bosicolly, Williom of Occom postulated that the simplest opproach to ony problem was the best. Specifically, he soid, "Avaid pastulating unverifiable entities to account for whot can be explained mare simply and directly." This simplification

of mental processes has been a great boon to science even though science, by the odmissions of mony of my scientific friends, hos no such thing os on unverifiable entity. For example, one of my scientist friends tells me that there is no such thing as beauty because the concept connot be verified. As o result of such ottitudes, we have emerged with some queer notion that science and the scientific method ore the only things which con discover truth ond therefore onything else is a woste of time. Now, this method of thinking was all right as long as it remained in the field of science but there has been a recent, unfortunate tendency to opply it in the field of humon relotions where it doesn't fit ot all because the field of humon relotions consists, in foct, of nothing but unverifiable entities. Gradually, the public hos succumbed to the owe-inspiring sight of scientists stonding before blockboords covered with sworms of complicated mothemotical formuloe and has concluded, opporently, that life is becoming much too involved for the overage mon to understand and had better be left to the experts. So . . . the public stopped thinking ond contented themselves with things they could understond — the enjoyment of moterial things (Muir's pleasure seeking) ond loziness.

Whot is required for o solution of this problem of public indifference, which hos been bred by the supposed wonders of science, is to ossure the bus drivers, shop clerks, ditch diggers and section hands that they — and not science — hold the destiny of man within their hands. According to the statements of scientists and others, there is now a sufficient stock of nuclear weapons to wipe man off the face of the earth though there does appear to be a choice of whether we shall be burned and blown to bits or rot slowly to dust with radiation diseases. With such a potential, science ceases any longer to be a factor in man's destiny. From now on, man's destiny rests with people and how they act and why

they act the way they do. This brings us to my second foctor and both ospects of it must be onolyzed, that is, people's actions and the reasons for their actions. First, let's look of the problem of reasons.

Down through the oges, mony hove concerned themselves with humon motivotion. An exomple of one observotion is that of Thomos Hobbes in his Leviothon published in 1651. Hobbes wrote:

"Whensoever o mon tronsfereth his right, or renounceth it; it is either in consideration of some right reciprocally transferred to himself, or for some other good he hopeth for thereby. For it is a voluntary act and of the voluntary octs of every man, the object is some gaad to himself."

Since first reoding this judgment by Hobbes, I have poid a good deal of attention to human motivation and not once have I found a single shred of evidence to suggest that it is possible to determine why onybody does onything. From this I have evolved a principle of human noture which I coll the Low of Indeterminable Motivotion. Undoubtedly it hos been done before becouse, os Ecclesióstes soys in the Old Testoment, "There is nothing new under the sun." The low suggests, very simply, that no person knows, or con determine, the reoson or reosons why onother person performs o certoin oct. If the low is true, and I defy onyone to prove it wrong, it means that human individuals are connected by only the most superficial communication and that problems in humon relations connot be solved by trying to figure out why somebody did whot they did. It meons too that inside every human being there is a secret comportment — a locked box — the contents of which con only be known to himself. The comportment is seoled to everything except the individual's own mind ond neither torture, or truth drugs or lie detectors con prevoil ogoinst it. Let's look ot some exomples.

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A man puts a big bill in the plate at church. People remark how devout he is. Is this true, we must ask, or is he buying public adulation with the donation? Perhaps he would rather give the money here than pay Income Tax on it. We don't know — nobody but the man knows why he put the bill in the plate. He might give you an answer if you asked him and, in fact, he could give you any answer he wished because you could never find out whether it was true or not.

Some philanthropist gives out donations here and there and everywhere and is held up as a fine example of charity. Who knows why he gave the money?

Some people are tremendously active in community affairs. Why? Some say because they feel a duty and responsibility to their community and — they say, certainly it's not because they like to boss people or because they like the attention they get from others. Who knows?

There are two results from an application of the Law of Indeterminable Motivation. The first is that the most important facet of human existence becomes human actions; the reasons can be ignored. The second result is that whenever one hears a person giving a reason for something, for example when a politician on the platform says he is for subsidies because subsidies will make the country grow, one should remain completely calm and begin to prepare a list of alternative motives such as — a dwindling supply of votes — an affiliation with somebody who will profit from the subsidies and etc. Then, remembering that human actions are the essence of life, the observer watches carefully and continuously to see what actions evolve and which of the reasons he has listed best agree with the actions. It will, of course, always be impossible to conclude definitely but such a process contributes to the eternal vigilance of the people in regard to their own affairs — a vigilance that is slowly dying out. Let's turn, finally, to the problem of human actions which we have stated are the most important facet of human nature. I have selected two examples out of the many which exist in the world today.

The people of Russia have equalled or surpassed the Western world in almost every aspect of human existence except perhaps for the number of frigidaires, cars, mink coats, etc. (Note: Here one cannot help but compare the vitality of the Canadian people in the early days, when they had none of these blessings of technology and free enterprise.) In almost every case, Western 'experts' tell us that this powerful vitality is caused by fear

and almost complete domination by a police state. Our 'experts' are giving us reasons why the Russian people excel in the ballet, jet propulsion and nuclear weapons, basketball and hockey. The point is that our 'experts' have no idea what the reasons are for Russia's onward surge. World domination? Prove it—and fast if it is the real reason. National pride? — prove it, if you dare, because after all haven't we been told that they are a nation of ignorant peasants living under a system far inferior to ours.

We read of the men, women and children of Red China building dams, roads and airfields with their bare hands. We are told, again by the 'experts,' that the reason for this fanatical effort is the fear of being butchered by their Communist masters if they don't put forth the effort. Where is the proof of this reason? Let's inquire whether it is not just remotely possible that the people of Red China are sweating and toiling to produce a land in which they will have a happier life - not a life in which they are born in the mud, starve in the mud and die in the mud. Why do we attribute such lofty motives to ourselves and such picayune motives to the people of other lands? How smug can we get? How stupid are we being? Are the Chinese trying to build a nation — to improve their lot? Sensible and realistic observers in the last two years have informed us they are. The building of nations brings me to my final point.

Canada has more area and one-tenth the population of the United States of America. The some 18,000,000 people of Canada are huddled in a little strip along the International Boundary accepting, until recently, the few crumbs that were tossed their way. Is it possible to imagine, under these conditions, any more ludicrous situation than the payment of monies to able-bodied people, who are entirely capable of working, in return for not working. I speak of Unemployment Insurance and most of the other government controlled handouts that characterize Canada today.

I know, because I have heard it from their own lips, that there are people in Canada today who have a coldly calculated scheme for working the minimum number of hours (on a regular job) to draw the maximum amount of unemployment insurance. Others set up so many conditions for a job that such a job never appears and they continue to be parasites, crawling on the backs of the people who still know, and appreciate, a day's work. Such people as these parasites have no place in this country which, the 'experts' tell us, is growing by leaps and bounds. We must ask — Why does the government not only perpetuate this

farce but, apparently, try to outdo their predecessors, no matter who they were. We hear of a lot of reasons being given. Such measures strengthen the economy, it is claimed. Others have been given but the important thing is to first, gutline alternative reasons, second, keep a vigilant watch on actions, and third, conduct a tharoughly critical analysis of the situation. Where does the money come from? The money comes from the warkers, management and the government. The unionized workers simply have to demand a higher wage to account for their contribution to the plan. Management ups the price of its praducts to cover the increased cost of their contribution to the plan. Government ups the taxes to cover its costs of contribution and administration. All three units are closely connected and ane cannot (or daes not) act without the ather. The gavernment wants to remain popular with the voting public so benefits are increased. They raise taxes to cover the benefits. Labour and management raise prices and wages to cover the taxes. Who, it can be asked, is confused about inflation? The basic ingredients are greed and an attitude of forgetting about the other person — make sure we get what is coming to us. Here again, let's forget about reasons and explanationswhich can be anything that interested parties want them to be — and concentrate on actions and results.

Mr. Muir has stated the results very well. We are "pleasure seeking, indolent and saft. How soft? Just take a look at the last sham battle between the railraads, unions and government. Everyone just sat down, smiled and agreed. Their attitude? Don't worry about the rest of the cauntry. We've taken care of ourselves. I hope Mr. Muir knows of the real danger — ane that he did not express in his statement which leads my article. We, in the universities, see an ever-increasing apathy on the part of students. They have been told that a diploma is valuable in getting a job and so, following the example set by parasitic movements in our country which require a maximum return for a minimum of effort, they slop through university with as little work as passible. This is the saddest part. If it were just a case of letting the current working generation die off and beginning again it wouldn't be so bad. But we see the virus spreading to those in aur schools and we find them characterized by the same things as the working generation -- sloth, charging the maximum the traffic will bear without consideration of the effects on the country and an almost completely animal outlook an life — clothes, food, cars, jewelery and alcohol. Is there a cure for this situation? Certainly there is but it will take strong leadership to administer it — not any of the selfish, egotistical groups that exist in Canada today.

A friend of mine remarked recently that the western world wants all the freedoms of democracy but none of the disciplines or responsibilities. In the western warld, discipline has become a nasty ward — something that describes how the Russians and Red Chinese get their wark dane. Histary has written, over and over again, that nothing that is worth anything has ever been gained without struggle and discipline and, certainly, nathing can be gained by paying people for sitting on their hands or not growing wheat or, in fact, not doing anything.

I would hape that my statement of the law af Indeterminable Motivation would create a highly critical group, a group that would demand not only quality and performance but PROOF of quality and performance. I would hope too that it would give to the so-called common man camplete re-assurance that the destiny of man lies in his hands and in the way he trains his children and the way in which he educates them and that the destiny of man does not lie at Chalk River or Cape Canaveral or in the farms or factories of this country but in the homes, schools and churches. I would hope too that all the parasites in this country would be told that there is a job for them not sitting on a chair collecting unearned benefits but on a highway, or dam or airfield or any of the hundred other developments which cauld be started to make this country strong.

Well . . . what do we da? . . . start naw? . . . or do we wait until the prophetic vision of Mr. Muir is fulfilled and the endlessly toiling, fanatical, ambitious and dedicated hordes in ather lands — first equal and then surpass the productive powers of the western warld. We don't have ta run around looking for reasons. The pages of history are strewn with accounts of men's actians which have led to the downfall of arganized society under almost every conceivable candition. All we have to do is develop altruistic leaders, wha know the lessons of history — spit on our hands and — get ta work.



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# Human Relations and Scientific Management In Industry

A Paper Submitted to the S.E.I.C. Papers Campetition by Dauglas F. Wholley IV M.

In the 20th century, a character of uselessness was imposed an much of the work done in American foctories and offices. This was not a sudden occurrence, but rother, the result of a lang historical process.

The Industrial Revolution, which reploced the tools of the independent workmon with mochines owned by lenders of capital, transformed self employed warkmen into hired honds, subject to the orders of monagers. Groduolly, men felt themselves swallawed by a vast, impersonol mochine, which destroyed their self respect and, in a way, their identities.

A second Industrial Revalutian is now sweeping through American and Conadian Industry. It is quieter and more profound than the first and its name is "Human Relations in Industry." Its purpose is simply to give the worker a sense of usefulness and importance.

This chonge is due lorgely to the effarts af two pioneers: Frederick W. Taylar ond Elton Moyo.

Taylor, aften called the father of scientific monogement, wos foremon of the mochine shop in the Midvale Steel Co. in Philodelphio in 1882. As an earlier workmon Toylor noticed that mony workers foiled to produce more than a third of a good day's work. The men did not wont monogement to know how much they could produce as this would lead to a cut in rates ta yield o corresponding increose in production. As foremon, Toylor attempted to work out some system of management whereby the interests of labaur ond monogement might be the some. Toylor knew that monogement actually lacked the knowledge of what a good day's work should be. He then came to o logical conclusion; How could o man be held accountable far o good day's work when management had no idea of his capacity?

Taylor praposed that monogement should ossume at leost four new responsibilities:

(1) Develop a scientific method far each element of a man's work.

- (2) Scientifically select, troin, and direct employees.
- (3) Secure the caaperation of lobour in the effective opplication of these principles.
- (4) Provide an equal division of responsibility between workers and management in the ottoinment of desired efficiency.

The Bethlehem Steel Compony solicited Toylor's assistance when the Spanish American Wor broke out. This illustration will indicate the nature of the experimentation conducted by Taylar:

The company hod 80,000 tons of pig-iran to load for shipment. Speed was imperotive. Taylor arrived to find 75 men hondling an overage of 12½ tons of iron per doy. His tosk was to greatly increase the average loading speed and reduce the cost of hondling. Toylor selected a smoll, husky Dutchman and coached him in impraved methods of hondling and loading. By improving the methods used in picking up and loading the 98-paund pigs of iron, Toylar raised the Dutchman's overage doily laading from 12½ tons to 47½ tans.

Taylor's pianeering in time motion studies helped bring the moss production era which enabled workers to raise their autput ond their woges. Taylar's motive wos to help his fellow man; yet, he creoted a manster. By georing a mon's praduction to a machine, Taylor coused monogement to think of the worker os little more than a machine.

Since the only measure of efficiency was the best possible utilization of time, men were subjected to the nervous strain of keeping up to machines which olwoys moved o little faster than man's natural work pace.

A point came where speed-up no longer produced greater output.

At a Pennsylvania textile plont in 1923 vorious wage incentives were set up to increose production and decreose turnover of stoff. In one particular deportment praduction remained low and stoff kept quitting.

Elton Maya, a pioneer in Industrial Humon

Relotions was colled in. He discovered that the men were poor producers becouse they were unhoppy, o reoson that had not occurred to onyone else. The machines had been set up so os to deprive the men of virtually all human contact with one another. Lonely, they fell into melanchally and hypochandria. Mayo prescribed four daily rest periods for the workers to relax and provided a nurse to whom they could complain. These two relatively minor changes produced a stortling change;—turnover immediately diminished and production reached the established quotos for the first time.

At a plant near Chicago on experiment was performed to determine the effects of lighting on the worker and his output. A group of girls was moved into a room with variable lighting and onother group into a room that remained os before. To the omozement of the company, production shot up in both rooms. Lighting was reduced in the first room and production still rose. However, it continued to rise in the second room os well. Not until Mayo wos colled in to moke tests of his own did the company discover what had hoppened. Both groups were producing more because they had been singled out for special attention. excitement of the tests mode them feel that they were no longer machines.

Elton Moyo's experiments were widely hoiled os o londmork in sociol science. Actuolly, they reveoled nothing that could not hove been learned from any foctory hand. Every humon likes to feel that his work is important, that his boss is interested in him and appreciates what he does. In a sense, the importance attached to Moyo's findings is a measure of the indifference toward people into which monagement had follen in its single minded persuit of efficiency.

Because of this indifference, the deep rooted, mutual interests of workers and management, os partners in production, were lost in shallow attitudes of suspicion and hostility.

Hordheoded, hordfisted monogement believed that tenderness was weakness. Workers should not be coddled, lest they loof. Management believed that the only drives to which they responded were greed (more money) or fear (of dismissal). To proise them was to invite increosing demands.

Labour, on the other hond, thought of monogement os silk-hatted copitalists, who automotically opposed onything good for the workmon. Noturally, by reflex, the worker opposed anything management foroured.

A great change in bosic attitudes was necessary for Moyo's new science to make headway. In 1937 the Wagner Act made management learn that it had to learn to live with unions. The chonge was hastened by World Wor II, which provided the patriotic necessity for industry to achieve maximum efficiency. It also flooded the lobour force with millions of housewives ond other new recruits relatively free of the old hostilities and suspicions.

Monogement began to learn that the oncefeared unions themselves held potentials of higher production. In Pittsburgh, the United Steel Workers challenged one management to name its most productive deportment. Then the union boosted production there by 210% in one month. In the Toronto plant of Lever Bros., union and management, working together, trimmed the number of workers from 693 to 512, representing a decrease in the wage bill of 17%, yet ochieved greater output in a 40-hour week than in a 48-hour week before.

Housewives ond other new workers, in industry because of the war, found that old hands deliberotely limited their output from feor that Taylor's time-and-motion-study disciples would cut their poy rotes by roising production quotos. More and more monogers reolized that moximum output could be realized only by finding woys to remove these old forces.

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Surveys in dozens af plonts disproved one of monogement's fovourite beliefs — that workers wanted anly more maney. Vorious psychologists and sacial scientists concluded, after ten years of polling workers, that the four chief desires of workers ore:

(1) Security — the right to work continuously of reasonably good wages.

(2) A chonce to odvonce

(3) Treatment os humon beings

(4) Dignity.

However, all investigators agreed that modern industry largely frustrates these desires. Industry faund that the workers did not feel that their company was "interested in them." Several investigators found that the overage worker regarded his status as frozen, with little hope of advancement, and hoped to keep his sons from doing the same sort of work.

There wos ogreement on the couses of these ottitudes. Businesses had grown to such a size that the averoge warker lost all sense of personal contoct with the employer. Mechanization took oway oll sense of pride and self-identification with the final product. The repetitive nature of many tasks took away any craving for prestige; the hope of advancement was lost in the growing tendency to choose management material from young callege trained technicians.

At this time monogement itself was undergaing o revolution. The great awner-monogement dynostics were being wiped aut by death ond taxes. In the place of Ford, Cornegie and Rockefeller had come the professional managers, the engineers and trained techinicions. They toak over huge industrial societies and their duty was to increose profits and provide of air return to the stockholder. The tremendaus diffusion of awnership made it passible far the monagers to give first concern to the economics of their industry. Profits were the test of efficiency and efficiency depended upan the welfore of the warkers. Therefare, the new managers welcomed experiments.

Profit shoring plans, in which the workers

share the sovings mode by increosed output; painting out to the workers the importance af the port that they moke; decentrolizing of industry to increose production by improving personal contact between management and stoff; oll these were tried at this time and remain with us tadoy. Companies replaced time clocks with the honour system, provided coffee for morning breaks and spacious, well lit, cleon cofeterios for lunch and reloxation. The new Ford office building in Dearborn, Mich., has a swimming pool on the roof for stoff use. A new owareness of the role of employer and employee is evolving.

Actually, human relations is nothing more than good will — and opplied cammon sense. Such things as making a plant more comfortable and friendlier are the things that count. The attitude that: "We give our employees a Christmos porty and that keeps 'em hoppy until we thraw 'em a summer picnic," does more harm than good. Also, good human relations are not created by mere words, but rother by beneficial and positive actions.

The owareness ond opplication of good human relations represents a trend toward o new philosophy of monagement.

Mr. Clarence Froncis, ot o convention of the Notional Association of Manufacturers said:

"You can buy a man's time, you can buy o man's physical presence at a given ploce; you can even buy a measured number of skilled musculor motions per hour or day. But you connot buy enthusiasm; you cannot buy the devotion of heorts, minds ond souls. You hove to eorn these things . . . it is ironic that Americans — the most advanced people technically, mechanically and industrially — should have waited until a camparatively recent period to inquire into the mast promising single source of productivity: nomely, the human will to work. It is hopeful, on the other hand, that the search is now under way."

Adapted from an artcle in Time, April 14th, 1952. Other references: THE MANAGEMENT OF LABOR RELATIONS, Watkins and Dodd.

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# YOUR CAREER AS A CONSULTING ENGINEER

by MR. W. L. WARDROP, P.Eng.

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It is o greot privilege to be osked to write on orticle for your publication, "The Slide Rule." I can think of no subject that I would rother write on at this time than that dealing with your coreer as a Consulting Engineer. With the growth in the consulting engineering field in this area over the post few years, it is timely that the new groduate should want to look towards the possibilities in this field when considering his professional coreer.

It might be oppropriate to stort by endeovouring to define the words "Consulting Not all people agree on the definition of o Consulting Engineer, but one which does oppeor to have received the occeptonce of mony in the field is os follows: "A Consulting Engineer shall be o Professional Engineer who corries on his own engineering proctise and has no financial offiliation with monufocturer's ogents or controctors, other thon fees for professional services rendered. Further, he shall not be a full-time employee while of the some time corrying on his proctise of consulting engineering." It is significont to note that a Consulting Engineer must, of necessity, be a Professional Engineer, ond while the definition does not indicate such, he should be o Professional Engineer with oppreciable experience. The Association of Consulting Engineers of Conodo attempt to cover this situation by requiring a minimum of five years in the consulting field before membership con be obtoined in that ossociotion.

There ore those who hold the view, ond rightly so, that when the client engages the services of a consulting engineer, he does so on the bosis that the consulting engineer has ample experience in the specific fields for which he is engaged. With this viewpoint in mind, it would not be reasonable to establish yourself as a Consulting Engineer immediately upon graduation from University. It is necessary to mention this point because one might in his undergraduate year, be attracted to the consulting engineering field as a result of observ-

ing that Consulting Engineers are the highest poid group in the profession. Of course, this foct should be clorified by odding that the persons reporting os consulting engineers ore in general limited to those who are individual consultants or ore the principles of a consulting firm. In other words, the few who con clossify themselves os consultont engineers moy and will probably be well rewarded both from the stond point of remuneration and professional satisfaction. While the overage engineer employed in o consulting engineering office moy not receive ony greater financial return than in some of the other engineering fields, there ore o few decided odvontoges which moke employment in the consulting field extremely ottroctive.

The engineering in the consulting office olmost invoriobly corries out work directly reloted to engineering. His chonces of being encumbered with duties other thon engineering ore very remote. When quolified, he will be employed on the octuol design of o project and in most coses will be given the opportunity of seeing the project through to completion. He will hove the opportunity of working very closely with the client and thus will obtain a sense of great satisfaction in having contributed his skills and knowledge to a porticular project. Furthermore, he will work in close ossociotion with other engineers. Becouse of the voriety of the work and the broad area to be covered, the engineer in the consulting office has the opportunity of goining on immense omount of experience in o comporatively short time. Generally speaking, he has unlimited scope for initiative which is one of the moin ingredients in the development of o professional coreer. It is true that many positions in industry ond in other engineering fields offer ottroctive professional coreers to the new groduote, but few con offer o coreer more specifically related to engineering than that enjoyed by a consulting professional engineer.

Conodo is o new country ond thus the

future for the consulting engineering field here should be especially promising. The past two decades have seen a considerable increase in the consulting engineering field with many new names added during the last few years. Many of the older firms are now entering what might be termed "second generation" with younger principal engineers now assuming responsibility in the field, still carrying on the names of the old established firms which have contributed so greatly to the development of Canadian Achievements in the Engineering field.

It is probably only in places such as Canada, with its ever expanding boundaries, that a new consulting firm could hope to become established. Typical of this situation is our own province of Manitoba where five years ago, there were no independent, private consulting engineering firms in practice. Now there are at least six and in all probability in the next few years, this number will be increased. It is a great credit to the people in Manitoba that they should accept and support the development of local engineering firms in this province. Today there are close to fifty engineers employed in private consulting engineering firms in Greater Winnipeg, whereas five years ago a graduate engineer would have had to go either east or west to find employment in a consulting engineering office. Manitoba is just beginning to enter an era of great activity our northern boundaries are being extended, our natural resources are being developed and new industries are being located in the area. In the next twenty years we will see a tremendous increase in residential development. I am certain, we can look forward with confidence to the future of the Consulting Engineering field in this area.

One of the factors which has helped bring about the success in the consulting engineers field, here in this area, has been the enthusiasm of the young engineers. They have had to depend on their own resourcefulness, coupled with intensive research to acquire the

necessary experience with which to gain public confidence. The manner in which this has been done, reflects great credit to the teaching staffs at our universities.

It is now possible for a client in this area to obtain private professional engineering service in most of the engineering fields such as structural, mechanical, electrical, municipal, mining, geological and chemical engineering. In most cases, there are at least two and possibly more firms in a position to offer service in each of the above fields. Prior to the establishment of engineering firms in this area, engineering service was mainly available through companies which supplied equipment or materials. This applied in particular to the various phases of engineering services as related to the construction of commercial and industrial buildings. As the consulting engineers services became available many of the companies adopted the policy of refraining from providing such service. While the practice still prevails in some areas, there is a definite trend towards engineering services being provided by recognized Consulting Engineers. Several of the architectural firms now employ engineers on their staffs, which is certainly within the scope of the Engineering Profession Act of the Province of Manitoba, providing the engineers so employed are registered Pro-fessional Engineers and have the necessary qualifications to practice in the particular field elected. In this regard it would definitely not be proper for a mechanical engineer to assume responsibility for structural drawings or viceversa. While the Association of Professional Engineers of the Province of Manitoba does not register its engineers in specific fields it should be clearly understood that this situation is governed by the rules of Ethics and Practice. The engineer should constantly be aware of his obligations to the engineering profession.

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There have been mony instances where the clients interests have been seriously jeopardized os o result of a supply firm having provided the engineering service. A paint which should be clearly understood is that ony professional engineer can provide a design whether he is self employed or employed by an equipment supply firm ar by ony other organization; but having provided the design, he is required under the terms of the Engineering Professian Act ta stomp the design with his seal. We in the Consulting Engineering field would like to be assured that anly Registered Engineers corry aut engineering design and thot these services wauld be provided on the some bosis os those in the consulting field. If this were the cose, competitian would be foir and reosonoble, but unfortunately, there are still many instances where the engineering service is provided with the cost hidden in the price of the product with the result that the client ends up poying more than he really should for his professional service. With the cooperation of the supply firms and a clearer understanding on the part af clients and others cancerned, it is hoped that there will be cantinued improvement and that in time, the cost of engineering services will be disassociated entirely from the cost of the product. When this time arrives, everyone from the client to the manufocturer and supplier will benefit greatly.

How daes this offect your career os o consulting engineer?

- It would provide you with greater opportunity of employment in a field very closely allied to your specific type of training.
- 2. It would ollaw local engineering resources to develop more fully with the result that ultimately firms in this area would be able to compete from an experience point of view with firms in other ports of Conada, and in some cases with consulting firms from other countries such as the United States. It might be of interest to nate that even now, after only five years, there are as mony Registered Engineers involved in the consulting engineering field here as there are in such other large fields of employment os the

City of Winnipeg and the Monitaba Government. This number is likely to double in the next five years.

Your work os on engineer in o Consulting Engineering Office would fall into one ar more of the following catagories: (a) design (b) specifications (c) controcts (d) field engineering (e) project resident engineer. As o Junior Engineer, you might be employed as o member af the resident staff on the canstruction of engineering works. It is of utmost impartance that os much field experience os possible be obtained before an engineer becomes engoged on octuol design. As a Resident Engineer, you should be responsible far field loyaut and inspection of construction including progress reports and the obtaining of information far finol "As Built" drawings. Field Engineering generally includes preliminary surveying ond the obtaining of topographical information necessory to design the focilities. It olso covers field layout where the project is not of such size as to worrant o resident staff.

The moin function of the Consulting Engineering Office is the preporation of plons and specifications and the awarding of Construction Contracts. In some cases the Construction Contracts are owarded directly by the client where a corporation is involved. Examples of this would be the City of Winni-

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peg and the Monitobo Government. The fully qualified Engineer ossumes responsibility for the design phose, although he moy have one or two juniar Engineers or design technicians working with him. Once the design is campleted, it is turned over to the droftsmen for final preparation of the drawing. The Engineer, then prepores the specifications for typing and reproduction, checks the drowings in detail, and finalizes the project ready for the colling of tenders. During this stoge, the Engineer is required to analyze ond opprove any requests for equipment alternotives. When tenders ore received, the Engineer prepares a tobulation for consideration by his client ond mokes recommendations with regard to the awarding of the controct. Where possible, it is odvisable that the Design Engineer be responsible for the construction stage, and while he daes not necessorily spend oll his time os resident on the project, he will moke sufficient visits to ensure that the work is being carried out in accordance with the plans and specificotions. All requests far changes are outhorized under the opprovol of the Design Engineer.

Only the larger projects con be effectively arganized in this woy. There ore invoriobly o multiplicity of smoll projects which must also be processed through the consulting engineering affice and these ore generally carried out

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by Engineers on an "As Available" basis.

What charocteristics in an Engineer would be best suited to o career os a Consulting Engineer?

1. The Engineer shauld have a saund knowledge of bosic engineering fundomentals.

2. He should be copoble of carrying out research where necessary.

3. He must be willing to assume responsibility.

 He must be unbiased in his thinking, eager at all times to benefit from improved techniques.

5. He must be odept in his dealings with clients and the controctors.

He must be especially conscious of detoils.

7. He must be copable of expressing his opinion cleorly and concisely both arally and in writing.

8. He must be copable af approising the

cansequences of his decisions.

A great deol could be soid about respansibility. The Engineer in the Consulting Field should be encouraged to develop o deep sense af responsibility for the work which he carries out. In this way he will develop a pride in whotever phose of the project with which he is associated. It follows that he will be copoble of greater achievement, however, he must be reworded accordingly. It should be also remembered that the rate of increose of responsibility varies with individuals, some Engineers ore ready for responsibility sooner than athers. The success of o Consulting Engineer will depend very lorgely on the reputation that he can establish and maintain. There is no room in the Consulting Field far the Engineer who is satisfied to just get by. It must be remembered at all times that the Engineer as on individual is directly respansible to whatever he affixes his seal. Since castly works are almost in-voriobly involved, the Consulting Engineer must constantly be alert to the unexpected contingency. The criterian of o well planned and executed program af engineering works is a virtual non-existence of Extras to the Controct. This con only be occomplished as a result of the Engineer making a thorough analysis of the praject detoils.

Looking bock over the four years that I have had the privilege of practising as a Consulting Engineer I can say with sincerity that a Career as a Consulting Engineer offers great satisfaction. I think it would be a correct statement to say that the majority of those Engineers engaged in the Consulting Engineering field hold to this view. I have been most forunate in the selection of Engineers on aur stoff; many were obtained as a result of the sincere desire on the port of the Engineer to

follow a career in this field.

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### LIFT SLAB CONSTRUCTION

A Poper Submitted to the S.E.I.C. Popers Competition by Wendy Woods III C.

"There is nothing new under the sun." Even the most revolutionory new developments ore found to be but new odoptions af old bosic principles. And so it is with lift slob construction. While ot first glonce it might appear to be entirely new concept, it is in octuality only on opplication of one af the oldest principles of construction. Since the time mon advonced beyond the one-storey cove and begon considering two and three storey dwellings, it has been common knowledge that it is much simpler, and mare economical, to build of ground level than "up in the air."

In 1948, two young men, Philip Yautz ond Tam Slick, combined their ideos ond come up with the potented method for lift slob construction. The name odopted was Youtz-Slick Lift Slab, ond there are currently severol licences gronted under the patent to firms in the U.S.A., one in Puerta, Rico, and ane in Conoda.

The method is based on the principal of "lost things first." Design is begun of the bottom and carried through to the tap, while in octual construction, the top floor is in place first . . . enough to make on ordent structural designer shudder. Essentially, the method consists of pouring concrete footings, erecting the columns, pouring the floor and roof slobs one on top of the other of ground level, and then jacking each level up to its oppointed position.

The first design consideration is given ta the columns. The most critical looding on the column will occur during the first lift . . . i.e. lift of the roof slab. Here the column acts as a vertical cantilever, in that it is fixed ot the bottom and unsupported thraughout the rest af its length. Lifting of slobs is done by means of hydroulic jacks placed in the centre of the top af the column, and so loading is oxial. For these conditions, buckling is the type of foilure to govern the design, and the slenderness rotio is the critical quantity. For this type of "vertical cantilever," it has been found that

Euler's stondord column formulo reduces to the farm:

 $P = (3.14)^2E 1$   $4 L^2$ 

A sofety factar is also included to take core af initial impact and eccentricities of column section. Once the raof section has been positioned at the top of the column, it no longer as a cantilever, and so the standard emperical column farmula can then be applied. Since symmetry about both axes is desirable, round or square columns are preferable, but H columns are often employed. In some coses, precost columns ore used.

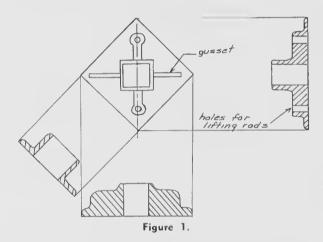
Flot plote design is o very complicated type of design, and will not be discussed in any detail here. The usual slab spon is about 26-28 feet. Thickness of the slab depends upon the slab spon length, as well as upon anticipated live and dead loads. Often the slabs are designed to act as cantilevers during the lifting operations . . i.e., they project beyond the outer row of columns. In some cases, the walls are then designed to act as load-bearing members.

For lorge floor oreos, slabs moy be lifted in two or more sections, porticularly if the floor plan is ather than rectongular. In coses where the slob is cantinuous aver a floor, it has been found that the slob will oct as a horizontal diaphrogm, and will assist the transverse bents in withstanding wind forces.

Side forms for the slabs are built up of the ground level, and as the slobs ore poured one an top of the other, the same forms are used far oll slabs. Befare the cancrete is poured, o heovy wire mesh is loid out. This serves to position pipes, conduits, and stair ar elevator wells. Around eoch column is set o lifting collor. If the slabs ore to be prestressed, tendans are laid out. The concrete is then poured for the first level. When the slobs hove reoched o certain proportion of their ultimate strength, post-tensioning is done. The wires or tendons ore tensioned, inside their sheaths,

with a jack, held in place by a conical wedge, and finally grouted in place. Since the top of one slab must act as a mould for the next, the surface must be smooth. Between each layer, a curing compound and a separating or bondbreaking compound are spread completely over the intermediate surface.

The lifting callars (Figure 1) not only carry the slab up the column during the lifting operations, but also act as permanent connections between the slab and column once the floor is in place. Collars must be designed to carry shearing stress, and bearing stress against the slab. If any lateral load is to be applied ance the slab is in position, the callar must also be designed to take care of this mament. The callar is stiffened by means of gussets, and thus stiffness is developed in it in excess of that in the plate. It can then be assumed that the callar is rigid and will not deflect.



The lifting of the slabs takes place after they have attained a sufficient amount of their strength . . . usually after a week or so the slabs are sufficiently cured. Actual lifting is done by means of hydraulic jacks placed an top of the calumns. From each of these jacks, two tension rods run down the sides of the column, and their threaded ends fit into the hales in the lifting collar. As many as twentyfour jacks may be used to lift a single slab, depending an the weights, span lengths, and number of columns in the slab. The jacks are electrically controlled fram a manually-operated cansole, often located on the top slab being lifted. The lift can progress three inches at a time, and at a rate of about 3-5 feet per hour.

Depending on the size and weight of the slabs, and the lifting capacity of the jacks, slabs may be lifted individually, or in piles ta an intermediate position, and individually from there.

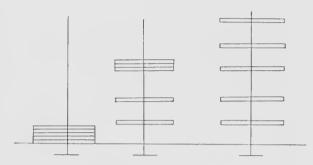


Figure 2 - Lifting Sequence.

When the slabs have been jacked up to their position, they may be held in place by the jacks until permanent connections are made by welding shear plates to the column. (Fig. 3). Another practice is to hald the collar in place by means af balts thraugh the column flanges, as well as by shear plates. (Fig.4). To add rigidity to this connection, steel wedges may be driven in between the collar and the column. In case the bearing area of the collar is sufficient ta withstand the shear stresses developed by the live loads, the lifting collar may have additional reinforcing steel welded an ta increase the bearing area.

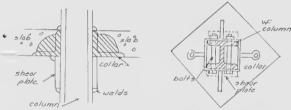


Figure 3 — Cannection.

Figure 4 - Connection.

There are many advantages of this system aver the more conventional construction methods. A conspicuous saving is made in actual working time. Elaborate form-work and finishing of concrete is unnecessary. Actual construction time is shartened, due to

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the fact that all cancrete pauring is dane an the same level. Castly delays due to inclement weather can be eliminated as soon as the first slab has been lifted, as it provides protection for the workers.

While quite a high degree af accuracy is required in the alligning af canduits, etc., and in the plumbing af calumns, the actual canstruction daes not require a particularly highly-skilled, and therefore expensive, type af warkman. Specialists are necessary, however, for the actual lifting process.

Sub-cantractars are also able to effect many savings. One big item is that af haists. Each lift can serve as an elevatar to carry up the heavy equipment and installations required far that floar. The flat surface of the slabs makes far mare economical running of pipes and wires at each different level.

Tatal casts, including materials and labar far assembling and lifting slabs, have been calculated in many instances, and they always shaw a saving aver assembled-in-place types af constructian. It was estimated that in the erectian af the Fard Matar Campany's affice building, erected in Dearbarn, Michigan, a saving was effected af 27c per square faat, ar an aver-all saving af 40%. This figure daes

nat include savings due ta shartened time far construction.

An autstanding American architect had this ta say about the Lift Slab methad: "An imaginative architect, bearing in mind that he has camplete freedam ta place nan-laad carrying partitians af any type anywhere between the twa flaars, can accamplish great ecanamy and achieve real beauty."

There is actually anly ane really majar prablem canfranting lift slab cantractars at the present time, and same af the best engineering brains in the cauntry have been unable ta salve it as yet. The difficulty lies in the design and aperatian af the lifting jacks. Any up-and-caming yaung engineer wha can salve the riddle af haw ta make a jack aperate efficiently, under canditians af extremely high laads, at a rate cansiderably in excess af three feet per haur, has his future assured in this field.

#### **REFERENCES:**

Civil Engineering . . . the Magozine of Engineered Construction.

Structurol Aspects of Lift Slob . . . F. E. Koebel. Memos of the United States Lift Slob Corparotion. Mr. W. D. Lount, Canadion Lift Slob Co. Ltd.

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Student Section

# EDITORIAL

A glance at some of the articles in this magazine will show the reader that the greatest problem facing our society today is the race for technological supremacy with the Communist world. There is no need to repeat here what has been said so often before about Sputnik, about the superiority of Russian education, about the vastly greater numbers of Engineers in the Soviet Union, or about the relatively more efficient utilization of this technological manpower under their government controlled economic system.

One conclusion which can be drawn from all these facts is that the Engineer holds the most important position in the Western World's answer to the Communist economic challenge. When it comes to producing Engineers in great numbers and utilizing them efficiently we cannot hope to beat the Soviet Union, for, as Professor Bridges stated in his article, the only way in which we could hope to do this would be to exert strict government control over Engineers and their education, and that would be the end of the freedom we are trying to defend.

How can we fight this battle other than by giving up the freedom we are trying to defend? If the people who believe in our system of government are correct, we can do it by exercising that freedom. We can do it by meeting each decision that faces us, giving it our thoughtful attention, and doing our best to reach a conclusion that will result in the greatest benefit for ourselves and for others.

To the Engineer, who holds a key position in our society today must fall the greatest responsibility to exercise this freedom. The the Engineers at this University capable of accepting this responsibility? I don't think so. In the two previous U.M.S.U. presidential elections, and in this year's election for Senior Stick, the Engineering students have shown good examples of a group emotional reaction, of a large mass of people following a war cry without ever stopping to examine the issues involved and make a conscious decision.

In two of the above mentioned cases this writer was in favor of the results obtained by this group thinking, and in one case, opposed to them. But whether the results are good or bad, we must abhor this method of reaching them.

The Engineer uses logical and analytical methods in his daily work. It is vitally important that he learn to use the same methods in public affairs. The Engineering students at this university must feel shame at being known as political infants, who can be led here and there by any person who can convince them that they are being wronged, and who can be made to rise up against anyone accused of acting against them, no matter how irresponsible or hypocritical is the accuser. These Engineering students must learn, and learn immediately, to use their intelligence, not in just one phase of their lives, but in every phase.

GREN YUILL. Editor.



# UNIVERSITY OF MANITOBA ENGINEERING SOCIETY STUDENT COUNCIL

Seated, left to right: Gren Yuill, (Publications Editor); Brion Loxdol, (SEIC Chairman); Chuck Kellner, (Sec.); Professor Bridge, (Faculty Advisar); Ken Boiley, (Senior Stick); Emil Hoin, (Senior UMSU Rep.); Jim Thomson, (Tours Chairman); Dove Mitchell, (Athletic President); Bob Devis, (Treasurer).

Standing, frant raw, left ta right: John Peters, (1-2); Doug Wholley, (Brown and Gold Rep.); Bob Solohub, (Social Chairman); Borry Stronge, (Assistant Treasurer); Bob Duff, (1-4); Bill Devries, (3-C); Gorry Reid, (Jr. UMSU Rep.); Al Smith, (Publicity Choirman); Al Stevenson, (Geological), John O'Brien, (1-3), Chuck Honeymon, (2-1), Ken Reinch, (3-E), Poul Mitenko, (1-5).

Stonding, back raw, left ta right: Rod Bower, (2-2); Bill Reid, (2-3); Borry McKennitt, (UMSU Secretory); Rick Chose, (2-4); Bob Begg, (3-M); Nelson Segolski, (1-6); Murroy Duncon, (Social Chairman); Dennis Lloyd, (1-1).

Missing: Konrod Tittler, (Manitoban Rep.); Wendy Woods, (Drama Chairman).

### Senior Stick's Message . . .

Once ogoin Engineers con look bock on o year of compus leadership. The extremely high level of participation in the Society's extra-curricular activities was reflected in our damination of the Inter-Faculty Athletics. The Athletic President and his convenars are to be congrotulated for their very worthy efforts. On the lighter side, this year was also one of many Engineering sacial successes. The Power Prom, the highlight of our social calendar, praved to be the best formal of the year despite advance pessimism and the numerous closs outings were all well attended.

The Tours Cammittee, a new innovation this year, met with some apathy earlier in the term but then succeeded in showing great potential. I should like to recommend that the U.M.E.S. undertake more Professional Development activities in the future. The importance of receiving an early insight into the Prafession can not be aver-emphasized and the efforts of the S.E.I.C. to this end have been involubble.

An unusual number of vitol issues developed in the past year and we were fortunate in having a strong, mature council working for the faculty. To these Engineers especially, I extend my heartfelt thanks.

To the students who elected me, thonk you for the faith placed in me ond moy your college days be as rewarding as mine have been.

K. A. BAILEY, S.E.I.C. Senior Stick of Engineering.

### PAGE 21

It is traditional for the editor of the Slide Rule to write a shart article, entitled Page 21 and placed os for os possible fram that page, in which he comments on the state of affairs of this publication and thanks all those who aided him in its completion. Therefore I will follow in the footsteps of my predecessars and first offer thanks to Jahn Neilsan, the Business Manager, who was in charge of selling advertising, and who did more work to make this book possible than anyone else (even the editor).

Thanks olsa ga to Ken Blowatt and Ed Pascal, wha were in charge of the Graduate Section.

I would like to express my oppreciation to Dean A. E. Macdonald, Praf. G. A. Russell, Prof. E. Bridges, Air Commodore Rutledge, Mr. W. L. Wardrop, and all the students who contributed orticles. We are especially fortunate this year in having three technical articles submitted by Engineering students themselves. A glance through post editions will show that we have never been this fortunate befare. In the past it has been hard to find articles af a technical level neither too simple or too difficult for on Engineering Student. Hoving the students themselves write these articles seems to be the ideal solution.

In the post few years the Slide Rule has become fixed in the farmot which you see in this issue. So for this has been quite satisfactory and shauld cantinue to be in the years to come, especially if the students cantinue to submit technical as they have this year. However, any students who would like to see a change mode in next year's edition shauld feel free to step forward and voice his opinion. This magozine should present what the students want to see, and I am sure the editor of the Slide Rule in 1960 will appreciate only new ideas or assistance offered to him.

GREN YUILL, Editor.





Page Forty-two



Miss Denyse Muir

POWER PROM QUEEN — 1959

### ENGINEERING

Social Review

R. M. DUNCAN — R. SOLOHUB

Sacial Chairmen



Was this year a sacial success ar what? Just ask the fellows who attended the various UMES functions, and you'll find they will agree that this year was the best ever.

#### FRESHIE WEEK:

Within the canfines of a large warkshap, five ar six of our mare industriaus Engineers, under the able leadership of "Big Bill" Sullivan, were busy sawing and hammering like mad, trying to camplete the secret project (a madel suspension bridge with cars maving across it) which was to be the Engineer's can-

tributian ta the Freshie Parade. After many days of tail (and the add night of tipping) the praject was campleted. But, after all that effart, it seemed that the judges weren't as struck by the merits af aur display as the spectatars. Oh well, it's gaad incentive far next year.

The glamaur of aur partian of the Parade was pravided by this year's choice for Freshie Queen, Miss Phyllis Forrest, riding elegantly in an Imperial convertible. As usual, there was a herd of eager, rawdy Freshman aut to guard

The campus beauties who vied for the title of Miss Power Pram; Louise Ray, Livia Rosario, Barbara Ison, Denyse Muir, Gail Ignot, Brendo Keith, Claire Middlehurst.





Genuine Cowhide.

A beauty from Medicine.

the float and get into the spirit of the occasion with much noise and loud yells.

#### FRESHIE RECEPTION:

With well over 200 Freshmen in attendance, this year's banquet and dance at the Marlborough Hotel was a "really big" deal.

Air Commodore H. H. C. Rutledge, as guest speaker, gave an excellent talk on Canada's Northern Defences. The Dean and Senior Stick also forwarded worthwhile advance to the fellows just starting off in University life.

Although not as numerous as last year, nurses from any of the city hospitals and the Home-Ec girls in attendance added much to the enjoyment of the evening.

#### STAG:

We pulled a little switch this year, and held the stag in First Term in order not to crowd all the functions into one term. This worked quite well, as it seemed there were more bottle-smashers there is year than ever before. Unfortunately, the entertainment (live) lined up did not show, but as usual, this did not deter the boys from downing many bubblies and creating much chaos.

#### POWER PROM:

The 29th Annual Power Prom, held in the Crystal Ballroom of the Royal Alexandra Hotel, was by far the greatest ever. Sigma Phi Delta far outdid themselves with the decorations, which added so much to the overall atmosphere.

A reception was held in the Windsor Room, preceding the dance, for the Council and Faculty members, Queens and their escorts, mainly to get everyone acquainted and the Queen Candidates introduced to the judges.

This year, the candidates were:

Brenda Keith	1st Year
Louise Roy	2nd Year
Gail Ingot	Civil
Livia Rosaria	echanical
Claire Middlehurst	Geological
Barbara Ison	Electrical
Denyse Muir Engir	neering Physics

After everyone was in good spirits, they filtered into the main ballroom, where the main body of Engineers and their dates were dancing to the fabulous music of Harold Green and his orchestra.

At about 10:30, Senior Stick Bailey gathered his flock of Engineers about him, and introduced Air Commodore Rutledge, who proceeded to praise the charm and beauty of the seven candidates vying for the esteemed title of Miss Power Prom. The announcement was then made: Miss Denyse Muir had won. Beaming radiantly, she received the traditional beer mug from the Air Commodore, then Miss Gail Johnson, last year's queen, presented her with a bouquet of red roses. This marks another first. This is the first time Engineering Physics has put forth a candidate, and they win first crack. Not bad at all, fellows!

The Engineering Ballet Corps presents LR2H.





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Last year's Power Prom Queen, Miss Gail Johnson, presents Miss Denyse Muir with a bouquet af roses.

The remainder of the evening was spent in dancing, then different groups headed far individual hause parties to round out a neverta-be fargatten evening.

#### GRADUATES' FAREWELL

The class af '59 wanted a Farewell ta end all Farewells, and they gat it. Appraximately ane hundred and farty grads and their girls enjayed a deliciaus dinner at the Rayal Alex, after which the grads were presented with their traditional beer-mugs, and far them the daars were flung apen to the wide, wide warld beyond. The mugs were christened, and the party really started to rall. After the witching

haur, the party maved ta several hauses, and didn't seem ta even slaw dawn until sametime the next marning.

#### AWARDS BANQUET:

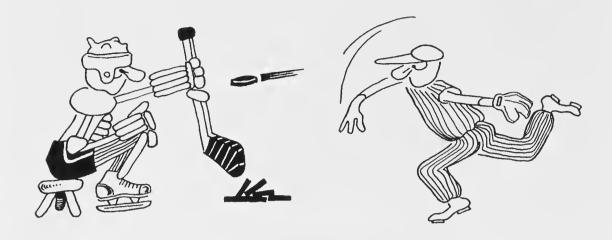
Ta hanar thase fellows who had cantributed their efforts, talents, and time to social, sparting, and other activities spansared by the UMES, an Awards Banquet was held an March 18 at the Marlbaraugh Hatel, where they were presented with appropriate awards. The gothering, after the dinner, moved downstairs in a body, then later in the evening headed for a few of the city's notarious halls for their annual scrounging.

Queens!



Queens?





# ENGINEERS IN SPORTS

DAVE MITCHELL, Athletic President

As in post years the students of the Engineering Faculty have made the year 1958-59 o successful one for Engineers in sports. Although the winner of the intramurol sports trophy is not known os yet, there is a firm belief it can be rescued from Science, the leaders to dote. At present Science has accumulated approximately 1,850 points while the Engineers ronk second with 1,620. These point totals do not include the results of basketboll, hockey and volleyball.

#### GOLF:

The beermen started the year off by winning the team championship in the annual golf tourney at Southwood. On the team were Gord Crabtree, Bruce McDonald, Ken Lailey and Brian Weir. Congratulations should go to Erniie Dubnicoff, the convenor, for showing on active interest and gaining excellent participation.

#### 6-MAN:

In the 6-mon world, under the watchful eye of Roy Roscoe, the Engineers ended up in a 4-woy tie for first ploce. Much credit is due to Bill Smitiuch, and Don McPherson, who showed the drive and enthusiosm to bring this obout. Other big nomes on the club were Cliff Shirtliffe, Dave Cross, Rich Gettens, Bob Zimmerman and Q.B. Dave Mitchell.

#### FLAG FOOTBALL:

Flag footboll, the non-bodily contoct sport where injuries and lost tempers reign supreme had amazing participation this year. Six teams were entered although none came through with the trophy. Praise should go to Allie Borger and Al Smith who made up the 1,2 punch of team teom 5.

#### SOCCER:

The soccer season sow the Junior "A" teom cop the trophy for the second division league. The teom boasted such outstanding players os Ken Lailey, Borry Nelson, Ken Ritchie ond thot great inside half, Vic. Duy. This team was nearly beaten out by the Engineering third team which housed such stars as the Kenora Kid, Brian Reid, O. Sigvaldson, and the coconvenors, Ron Schreiber and Murray Duncon.

#### TRACK AND FIELD:

Although the Olympic style track ond field meet was held eorlier last year they still didn't manage to beot the weather, but Mike Ward did monage to get token in by o fair young lass ond succeeded in losing the Engineering bonner. Despite the weother Bernie Melmon put the shot into orbit. Tibor Potoky and Ron Schreiber olso ploced in the discus ond 440 respectively. The pursuit relay teom placed second with Schreiber, Max Boyachuk, Gorth Hand ond Nick Bobey.



Three members of Engineering's chompionship galf teom: Bryon Weir, Bruce McDonald, Ken Lailey.

Senior "A" hockey chompions.

Bock row, left to right: Doug Homlton, Al Melynk, Rich Gittens, Ted
Moffot, (Cooch); Gil Brown, Les Gerhordt, Dave Mitchell, Al Smith, Elmer
Malenkoff, Bryon Weir.

Front row: Boiley McKennitt, Ken Lailey, Don Whitmare, Jim Thompson, John Hiley.

#### **ROAD RACE AND CROSS COUNTRY:**

The Cross Country and Road Race had excellent participation with an average of 30 beermen entering each event. Team championship was won in the cross country by Ron Schreiber, Mike Ward and Eric Anderson.

#### **VOLLEYBALL:**

In the volleyball world the Engineers entered 22 teams. Up to this point defaults have been scarce and special credit is due to Don Drybrough for maintaining this high standard.

#### **BOWLING:**

With regard to bowling there have been quite a few Engineers participating in the University mixed league this year. Some of the more prominent were Don Drybrough, Ernie Dubnicoff, Al Stevenson, Guy Carlton and Howie Hamilton. From reliable sources they stand a very good chance of winning the Inter Faculty Trophy.

#### **BASKETBALL:**

This year the Engineers have loaded the B-ball court with an array of talent not seen in many a year. There are five teams entered and two are undefeated and will win their respective leaguers. The Junior "A's" made up mostly from last year's team still have in the fold Ken Geddes and Oscar (The Anvil) Sigvaldson. The Senior "A's", definite league winners were comprised of "Trigger" Smitiuch, George Pratt, Bob Zimmerman, Dav Mitchell, John Hiley, Dave Shearer, Harold Wilson, and Gord.

#### HOCKEY:

To date the hockey league is going smoothly. The Senior "A's" are sure winners in their league. There are the usual old guards still playing but a little new blood has been added with "Big Neep" Whitmore in the

Engineers' Juniar "A" team — Second Divisian hackey league winners.

Bock row, left to right: Daug Homiltan, Rich Gittens, Gerry Krur,
Vic Duy, Barry Nelson, Nick Bobey.

Front row: Sigmund Soudack, J. Skromedo, Ken Lailey, John Hiley, Dan Biglow.

Engineers' Junior "A" basketball Teom. Bock row, left to right: Ken Kee, Mike Ward, Oskor Sigvaldson, Bruce McDonald. Front row, left to right: Gary Locker, Don Johnson, Ken Geddes, Roy Rascoe.





twine. The gool getters are still Al Smith, Brian "Pop" Weir ond Gil Brown, nat to mention the line of Hamilton, Hiley ond Gettens, Loiley, McKenzie and Malokoff plus "Assists" Mitchell, ond better lote than never, Borry McKennit. The Junior "A's", Senior "B's" and JK"B's" are halding their own. To nome o few, the big Junior "A's" have Al Stevensan, O. B. Strange and J. Love. Senior "B's" and Junior "B's" have Keller, Haneyman and Bolocko, Isoak, Smitiuch respectively. The big threat in the hockey world is the Junior "C's" "Ankle Runners," the only team that celebrotes before game time nat ta mention o few shots between the second ond third periads.

#### RIFLE

The Engineers under the canvenorship of Bill Poetkau are showing that the beermen are sharp-shaoters. They wan the intramural championship with G. Phillips, C. Fergussan, B. Paetkou and D. Tough. Seven teams were entered this year and faur made the shoot-off. Bill Paetkou will probably win the individual high competition.

#### HANDBALL:

Hopes ore high in the handball tourney with fellows such as Stan Johnson, Mitch Czaja, Dan Torbiak, Mike Word, Bob Zimmermon ond Bill Smitiuch entered. The Engineers have been ploying Friday and Soturdoy ofternoons to maintoin their high standard of play.

The year 1958-59 hos been o successful ane ond much credit is due to the convenars who did a very commendable job. I would like to thonk oll those who assisted me in the sports department this year.

**EDITOR'S NOTE:** Just before the Slide Rule went to press it was learned that the Engineers had won the intramurol sparts traphy, the Kotchepow traphy, with a total of 12,900 paints, more than twice total of their nearest competitor, and a record high for this competition.

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# THE STUDENT SECTION OF THE ENGINEERING INSTITUTE OF CANADA

By BRIAN K. LAXDAL Chairmon

The class of 1959. To mony this means only on odditional batch of pictures on the wall accampanied by o few historical notations that mark the end of onother university term. But, to same, scurrying aut into industry with iron ring finger protruding out from a well clutched beer mug in ane hand, o sheepskin in the other, and a slide rule in teeth ar suspended from belt this signifies the beginning af o new life — a profession.

As members of this prafessian their interests in it shauld porollel those of the Engineering Institute of Canada whase motto confirms its "dedication to service, to maintenance of high stondards and to the enhancement of the usefulness of the profession to the public." It is my sincere belief every undergroduote should become a member of the Institute before groduoting os it wos "creoted by ond far the engineers and dedicoted to their future.

This year we welcomed eighty new members into the Student Section of Monitoba. I am sure that the student section will continue to offer the undergroduote on insight into the professional world and will cantinue to oid in the development of the young engineer.

This year at the weekly noon hour meetings approximately 15 films covering a goad range of topics were shown. On Nov. 6, Mr. F. H. Brehaut and Mr. I Dovies visited the Engineer-

ing Building with a lecture and discussion period to aid the first and second year students in choosing the bronch of Engineering they wish to follow. The Winnipeg Chamber of Cammerce presented an Investment ponel an Nov. 13, with Mr. S. Scott, Mr. L. Cameron, Mr. J. MocKnight, and Mrs. E. Jockson, taking part. On his annual visit, Nov. 20, the president of the E.I.C., Dr. K. F. Tupper, delivered on informal lecture on educational techniques in Russia. The undergroduate technical papers competition was held in February with topics varying from highway canstruction to labourmonagement relations and oircroft control. As a rule the attendance at all those functions ronged from 150 to 200 students.

The above are o few benefits that the undergrads derived from the Institute this year but they will not stap at graduatian but continue as the engineer odvonces through the E.I.C.

ond os a M.E.I.C.

Sincere thanks are extended to the other executive members, Laurie Schmidt, vice-choirman; Jim Farsyth, secretary-treosurer; and David Lee, membership choirman; for the fine work they have done in the post year, and to Mr. T. White, aur projectionist ond Prof. J. P. C. McMath for his guidonce when problems were encountered.

And now . . . the closs of 1960.

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### The Engineers Strike Back

By E. G. A. BOWKETT and ORRY SIDERIS

We are, we are, we are, we are The Engineers;

We can, we can, we can, we can, Demolish forty beers:

For years this has been the traditional rollying cry and, indeed, battle song of the Engineers. These sturdy young men, inspired by foaming mugs of malt brew have carried on the great tradition of hoving the highest spirits on the compus, or anywhere else, for that matter. No other group of individuals could cloim to equal the great exuberonce, the love of life, and the inspired imaginotion of the Engineers.

But, what happened?

Silence reigned.

No sound of beer gurgling down thirsty throats;

No sounds of spontoneous hilority os another Artsmon "bites the dust";

No sound of tounts and jibes at that down-town foculty colled Medicine;

Does not a spark remain?

It was popularly thought not, for earlier in the acodemic year, the faltering Engineers were ribbed, razzed, ridiculed, and reviled as "dead fish."

What on oppolling label;— "deod fish."

Fortunately, it was not too late. The Engineers had almost been overtaken by that sticky sea of apothy which had totally engulfed the remainder of the compus.

A spork did remain. It was fonned to a flame, later to become o roaring conflagration once more. Very shortly thereafter, that dreadful appelation "dead fish" was to be proven ridiculous in the extreme.

One dark night, when every good student was fast asleep in his bed, a mysterious truck without lights stole stealthily onto the campus. This ploy had obviously been plonned with fearless skill, for the raiders had previously "cased the joint" ond knew the wotchmon's rounds. The truck was swiftly unloaded at the front door of the Science Building, and then, as silently as it had appeared, it was driven away into the night. Next morning the Science men were treated to several whiffs of

the previous evening's activities, much to their discomfort.

The Engineers had stirred. Incoutious souls scoffed, but those who understood the mighty capobilities of the beermen when oroused began to tread softly, for they could see that great and historic things were about to happen on that hollowed ground, the campus.

A short time later, o local radio stotion onnounced that the great Canadian Statesman and Leoder of men, M. L. St. Laurent was travelling ocross the notion, and hod orronged a short stop in Winnipeg. It seems he had been persuaded to visit the University of Manitoba, that great seat of modern learning, thot mighty bulwark of Conadian culture. At noon, M. St. Laurent and porty arrived at the UMSU building in an impressive cavalcade of stote vehicles. The elder statesmon was received with tumultous applause from the assembled students, and was obout to speok, when, Ye Gods! — Had they gone mad? All the Engineers in the oudience began to pelt the ex-prime minister with eggs, elderly fish, and assorted ripe vegetables. The student and assorted ripe vegetables. The student body wos mortified. Shome had been heaped upon the old "U of M" by the Engineers. Mob violence was overted just in time by the revelation, by M. St. Laurent's oide of an Engineering sweoter beneath his overcoot. Grodually, the student body, which is generally rather slow on the uptake onywoy, reolized that a clever hoax had been perpetrated by the Engineers, and everyone had been thoroughly taken in.

Having proved that they possessed the best collective sense of humor in the nation, the Engineers then set out to prove that they were a bright lot of lads, with keen inquiring minds thirsting for knowledge. To assist in this next achievement, the Medical faculty thoughtfully co-operated and provided a comprehensive display of preserved human organs. Unfortunately, most of the secrets displayed had long ogo ceased to be secrets to oll good Engineers. However, the disploy proved to be quite popular. So popular, in foct, that another faculty decided that some of the items required further and closer study. We hope that they benefitted from this study, although it is feored that they were out of their depth, and trifling with matters they cauld not fully comprehend.

Engineers in room 320 further indicoted their well-raunded cultural bockground by callecting and displaying o magnificent array af illustrations af that purest ore form, the female figure. What exquisite taste they displayed.

In addition, a bible study meeting of one haur duration was considered for too shart by a group of devaut Engineers, who, of caurse locked the doors of the classroom, thus prolonging the meeting. The Engineers olways do the right thing.

Cansider the Engineers entry in the Winter Carnival Snaw Sculpture Competition. Another dynamic demonstration of the Engineers boundless superiority over the remoinder of the campus. Since the Engineers had already cavered themselves with glory, and since the competition judges realized that Engineers were always perfect gentlemen, talerant of the weoknesses of others, the prizes were aworded to ather entries in the campetition. Hawever, Engineering rested secure in the knowl-

edge that their Ice Racket was without doubt the best in the shaw.

Commerce's Cadillac wos again passed by Engineering "little Nosh Rambler." This wos not surprising, since an obviously drunken "Buddah" hod been driving the Cammerce Caddy. Another victory far the Iron ring crawd.

Finally, the Engineers had an excellent opportunity to prove again their command af the sacial graces. A well known campus arganization, which far reasons af its awn had stolen the Engineering banner was honoured at its apen hause by the presence of two hundred well dressed Engineers clad in blue jeans ond tee-shirts. With perfect decorum the Engineers drank oll the punch in short arder, and did all in their power ta assure the success of the event.

Agoin, Engineers reign as the mightiest farce on the campus. This is reodily recagnized by oll ather faculties wha wait, trembling, for the next move by those titons, the Engineers.

The Little Nash Rambler.



"Chiseler."



Page Fifty-three

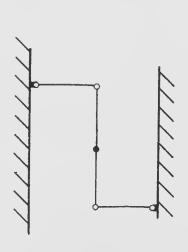
# A STRAIGHT LINE MECHANISM FOR USE BY ENGINEERS

-A Caffee Lab Praject.

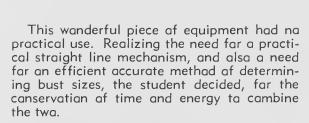
The date was Octaber 6, 1958. It was appraximately 10:41 when Praf. Gawley entered the raam and began the lecture. In the back of the raam in an unnumbered seat, sat a bewildered and rather tired III M student, far it was Manday marning.

On page 3 of the text Design of Machine Elements, Faires, Macmillan 1955, was mentioned Watt's famous straight line mechanism. This was of na major importance, as it was Manday marning, but by Tuesday evening, "What was Watt's mechanism?" A search of the library as shown in Fig. 1.

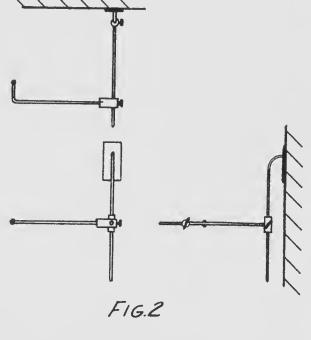
turing duplicates of the ariginal will achieve financial success far ane is required by every tailar, persannel manager and engineering student in the warld.



WATT'S MECHANISM FIG. 1



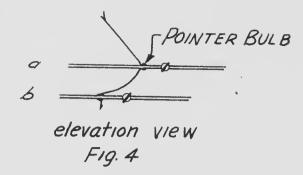
After several manths of design and construction, the final product (Fig. 2) has evalved. It has been predicted that the firm manufac-

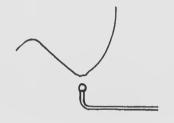


#### **Operating Instructions**

- 1. Befare the tests are begun, a check far extraneaus material (padding, etc.) that might cause erraneausly high results, shauld be made. This check shauld be af a fairly extensive nature, far even engineers have been faaled.
- 2. The subject is then aligned, her back against the wall, in such a way that the claser af the twa prajections in this case the ane being measured is in the vertical plane af travel af the painter (Fig. 3).
- 3. The harizantal bar is then raised ar lawered so that it is in the same harizantal plane as the paint of maximum deviation of the wall (a, Fig. 4).

- 4. The pointer is then gently brought into contoct with this point (Fig. 3). A coreful check should be mode to see that it is just o gentle pressure. This check, slowly and corefully corried out, usually produces results.
- 5. The reoding is then token on the horizontol bor (o, Fig. 5).
- 6. The horizontol bor is then lowered so that it is in the horizontol plane of the next point of inflection in the curve being measured (b, Fig. 4).
- 7. The pointer is then ploced in contoct with this lower point of inflection. Excessive



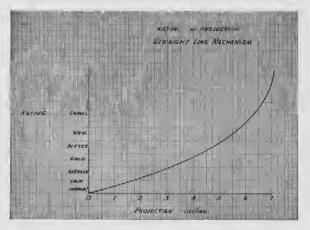


plan view Fig. 3

read here FIG. 5

contoct pressure will couse erroneously high results. A reoding is then token (b, Fig. 5) on the horizontol bor.

8. The orithmetic difference between the two reodings, "P" inches in Fig. 5, is the octuol projection in inches (inches of projection—i.P.)) This volue is then locoted on the groph below so that o roting may be obtained. It should be stoted here, however, that the results produced by conducting the tests are o function of the technique of the operator.



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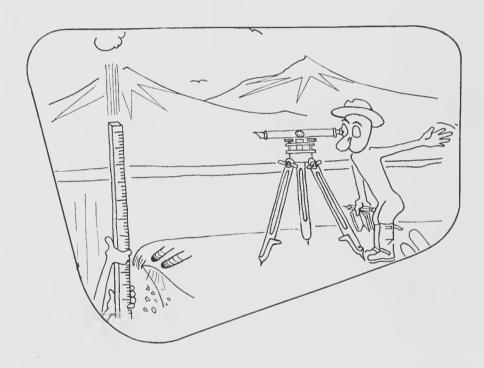
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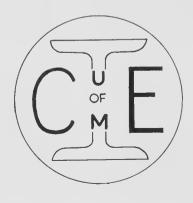
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WINNIPEG 3, MAN.

# CIVIL ENGINEERING



C L A S S O F '59





#### ROSS ADAMSON

A United College graduate. Wedding bells will ring in June. Member Phi Kappa Pi Fraternity. Future includes family and Manitaba gavernment. Avid Bridge Player and CURLER. Another member of the 3.14159 club. Often faund in the BIG "P".

#### GEORGE BALACKO

A dehydrated Civil whom Gad created (or located) in Stany Mountain. Member of the exclusive big "P" club and the tiny "c" club. Ambitian to be able to hold his pepsi-cola and smake Italian cigars. Active in many faculty sports including volleyball where he is well known as the Towering ceiling cracker.

#### ALAN A. BORGER

Kelvin grad—Active in Sigma Lambda Phi Frat. Valleyball and blitz star. "Al" has never been knawn to express his apinians and is cansidered in female circles as "king of the moosers". Future—Western Canada sewer and water tycoon.

#### LUCIEN G. BOSC

High schaal in Natre Dame de Laurdes; B.A. fram Gravelbaurg, Saskatchewan. Member EIC. Often seen explaining camplicated farmulae ta simple minded friends. He acts as a good reference text when lab. reports are due. Terror of the valleyball caurts and Suite Na. 11, Courie Apts. Future: Structural design.

#### PETER M. BRADY

A Kelvin graduate. Favarite expressian, "Anather double V.O. Charlie." Ex-president and still very active in the Sigma Lambda Phi arganizatian. Ambitian: To teach "Rudy the Owl" ta qualify far the 6 draft club.

#### ROY "GIL" BROWN

The smiling unshaven jay of Marathan, Ont. Attended high schaal in Part Calbarne. Always smiling and chewing a toathpick. Interests include hackey, Phi Kappa Pi Fraternity, hi-fi, practical bridge, big P and 3.14. Future lies in pulp and paper industry.

#### GEORGE CHAN

The anly Chinese student of the class. George is quiet, serious and studious which qualities we hape shall pave the way to a bright future.

#### EDWARD "TED" CLARKE

Ted is ariginally from the Lakehead. A member of Tau Kappa Epilson. Interested in church Y.P.U. wark. Detests beer (naw the secret can be tald). Hapes ta work far M.H.E.B.

#### PAUL DEAN

Member of the 3.1416 club. Calgary high school grad; naw hails from Landon, Ont. Member of the Phi Delts. Hard warker, but finds time for the Friday fun club. Future; masters at Stanfard after which (?)

#### DMYTRO DEMEDASH

"Danny" the Gimli Kid. Attended Gimli Callegiate. Quiet, seriaus, hard warking engineer with future plans far graduate studies in sails. Career—graund hag. Wedding bells are also ringing.

#### DONALD A. DRYBROUGH

From humble beginning in Tuxedo to volleyball czar of the campus, the "Brow" has made his five year plan one of both athletics and C-artistry. Inspired by an Irish influence he became a keener in his graduate year. His future rests in prestressed concrete.

#### DAVE DUNCAN

Dave is a fanatic of the sports car set, but he's otherwise quite normal. Other activiites include photogrophy, skiing sailing. Ambition: To have his awn plane. Probable future: Consulting.

#### CARL FERRIS

The foculty of engineering is finally saying goodbye to the second of the Ferris clan. A native at Wawanesa whose favorite sports are ankle running, hockey, wild girls and chesterfield rugby. Carl spent 2.5 fruitful years in residence and the rest of his spiceful career trying to outrun the constabulary. Future: More of the same.

#### JIM FISHER

From Lynn Lake, the "Snake lake Kid" is probably the youngest civil to graduate in the history of Manitoba. A big gun of the ankle runner squad. Future is unlimited and o member in good standing of the 3.14159 club. Jim is frequently seen about the big "P".

#### KEITH FORBES

A Winnipeg boy who attended Gordon Bell before entering U. o M. Quiet, hard working, engineer. Hopes to enter field of municipal engineering.

#### ALAN FOUND

"Fuzzy" entered engineering after graduating from Daniel McIntyre Collegiate. He is an active member of: the Winnipeg Bar Association, T.G.I.F. Club, Sigma Phi Delta Fraternity, and is also an original member of the Northern Nudist Colony. Future—A Community Planner in a big city with lots of well stocked bars, well stacked women, and a warm climate.

#### RON M. GORDON

"Mike" hails from Oak Lake, Man. He spent 3 years in Residence but this year decided that he should be further from his work and closer to downtown. Spent several summers with D.O.T. He is an avid flier (Member of Gimli Flying Club) and possibly will make this part of his future, although he talks of retreating to South America. Also, Ron has feminine interests in Brandon.

#### EMIL HAIN

Vice stick, UMSU rep., member of engineering deboting team charter member of TKE, outstanding card player, Big "P" supporter. Ventures into classes and labs occasionally. "C" methods obtained Emil a "B" stonding. Future—Marriage, Trans-Canada pipeline.

#### RUDY ISAAK

Rudy came our way from MBCI. Well dressed, witty and jolly. Rudy is known to his classmates as Rudy the Owl, — the butcher, — the Cougar or plain Sunbeam (Mixmaster). Great sportsman, Rudy stars in hockey, and volleyball. Ambition: Joining o "Six Droft Club." Future—Civil Service.

#### MATTHEW KENNETH KEE

Commonly called "Timber Dog". Habits—sleeping 'til noon in residence and humming "My girl rides in a '39 Chev but she gets there just the same". Claims to have rated the title assistant captain on no-star "ankle runners" hockey team. Also a champion "beep-beep" road runner. Future—Tail chasing, RCAF.





#### ROSS MADDER

Ross came into engineering via Daniel McIntyre Collegiate. One of the few grinders writing a thesis. He was president of the Young United Young People's group and a steady worker out at the YM. Future plans include a job where he can commune with nature on the week-ends or else P.G. work in hydraulics. He also plans an early marriage.

#### RICHARD TERRENCE MARTIN

Terry became "keen bean" of the class in his final year—disclaims any "c" artistry. A gold medal candidate, he also has found time for excelling in volleyball, soccer, and badminton. Future in Soil Mechanics—"Have auger, will dig."

#### KEITH McKINNON

Originally from Rivers, arriving in 4th Civil with many accomplishments. Graduate C.M.R. and R.M.C., flying officer. A wife who is a excellent draughtsman expecting visit from stork come summer. A good athlete— no difficulty making the Big "P" team. Future—R.C.A.F. Liaison Officer at the Azores.

#### ALBERT MELNICK

"The Pas" — "Snab" is a charter member of the 3.1417 and Big "P" clubs — likes surveying Beer and Redheads in that order. No definite plans for future except wedding bells in August, '59. A member in good standing of Phi Kappa Pi Fraternity.

#### DAVE "HI FELLOWS" MITCHELL

"Socks" — Kelvin Grad, engineering athletic president — also finds time for hockey, rugby, basketball, handball, tennis, curling, volleyball and 9:40's. Member of D.U. Frat. and president of club "P". Divides his spare time between W.G.H. and the Normandy. Future—Masters in Soils—everybody passes.

#### MATHEW EDWARD MOFFATT

"Muff" — Portage la Prairie Collegiate grad. Former member at the "Ankle runners." Sold his car in a vain attempt to keep the opposite sex away. Member of the Big "P" and "3:14" clubs. Former member of residence.

#### DON MOIR

Came from Kelvin originally. Doesn't believe in hard work, shaving or getting up early. Hobbies: Radio—Yes, Beer—Yes, Women—Not Yet! Ambition: Working on his second million—gave up on the first one. Future—Aspires to become a large wheel in the railroad.

#### LARRY MORISON

Gordon Bell grad. Zeta Psi Fraternity. Larry has developed a taste for malt products since entering engineering. Noted charmer of beautiful girls. Sports enthusiast. Excellent in curling. Ambition: To find a woman that goes curling.

#### GEORGE PRATT

A Norwood boy who made good. George gave up his athletic career with bias to master the slide rule. Although still active on the inter-varsity V-B crew he manages to amaze all with his marks. A member of the D.K.E. Fraternity and world reknown Big "P" fun club. Future—Municipal engineer, Treherne.

#### BRIAN REID

The Kenora Casanova, known as "Buzzy" by his better friends and "Fuzzy" by the girls. Takes part in most sports but devotes most of his spare time to the 'Club P'. His ambition is to hustle at the res. dances and join a rowing club that includes a large female membership.

#### CAM ROYLANCE

Gordon Bell grad. Delta Kappa Epsilon Fraternity. "Potlicker" Roylance is one of IVC's married men. His Dominion Bridge theories command great respect but we think he still has a soft spot in his heart for the good old straight "C." Plays a mean game of golf and seems to know his way around a handball court. Future—Structural Desian.

#### DAVE "LUNG" SHEARER

Gordon Beil grad. Sport activities include curling, basketball, golf, university girls, and W.G.H. (C.O.) Member of Friday Afternoon Club. Member of Phi Kappa Pi Fraternity and SEIC. Future—Defence Construction.

#### OSKAR SIGVALDASON

"The Arbarg Anvil". Ex-Arborgite, residence and watertower. One of the Grey Cup kids. Enjoys all sports and Calgary girls. Maintained an "A" average through the years. Extra curricular activities include schoolwork, painting nude girls, and fermented malt. Future— Very bright. Secret ambition is to own the company he works for.

#### NORMAN SLOBODZIAN

Hails from Red Lake, Ontario. "Red's" frequent week-end jaunts to Beausejaur keep him in tip-top shape for his hectic sports activities. Future plans—Community Planning pastgrad. studies, marriage in fall of '59.

#### ALVIN SMITH

"Smitty", Flin Flon. As well as being an excellent athlete excelling in hockey, publicity chairman on Council, president of the Friday Afternoon Fun Club, exciter of civil riots, the quiet man has found time to be a good student. Future—Highway Engineering with Standard Gravel in sunny Alberta.

#### BILL SMITIUCH

The "Civil" Brewmaster and refugee from F.G.B., is still trying ta promote graduate studies in "Beer" Supply and Distribution. Active in sports, the Big "P" as well as studies. Future—Chief Engineer for Walt Disney Studios.

#### EINAR SOLMUNDSON

A Hecla Island man. Came to the U. of M. to take the beerman's course. Has earned lieftime membership to Friday Night Club, and Rainbow Dance Gardens. Excels in chesterfield Rugby, Arborg style. Ambition: To become a champion jigaboo wrestler. Future—Government Engineer.

#### SIGMUND SOUDACK

"Sig' comes from St. John's, and before entering Engineering he completed two years of Science at the U. He is an all-round sportsman (one of his classmates could never beat him in ping-pong). Future—Probably post-grad work.

#### EGON STANIK

Finished high school in West Germany in 1953 prior to coming to Canada. Has since managed to get married aside from getting his engineering degree. Egon's main interest is photography. Intends to work for CNR and eventually take over the CNR presidency.

#### DOUGLAS J. STRUTHERS

Married father from Sprague, Man. Often seen playing cards, seldom seen at classes. Noted for mid-term breaks—like a month trip to Louisiana, yet maintaining a high scholastic standing. Future—Chief Engineer T.C.P.L. and long nights in trailer.





#### LARRY BLAINE SYLVESTER

(Zero Voids)—Carman, Monitoba. Very conscientious worker with special interest in soils. Came out of retirement to coach Ankle Runners to winless season. Member Big "P" Fun Club. Future—?

#### JIM THOMSON

A Kelvin grad, Jim came to Engineering from Science I. Well liked by oll, Jim usually attended the annual awards banquet and dance. Hence the nickname "Normandy". Some of his activities included class president IIIC, Tours choirman IVC, member of Zeta Psi Fraternity, played on two Intra-mural Jr. hockey championship teams, and was an enthusiastic patron of the Big "P". Future plans include Post-Grad in Business Administration at Western and the future looks bright.

#### EVERT MEINDERT VAN DOORN

(OB) 1937—Flin Flon, Man. Continued poor health indicated by many trips to hospitol but solved by marriage to nurse. Book Thrower, Grinder, Ex-Resident Student and member Big "P" Fun Club. Future—Working Wife.

#### MICHAEL ALLAN WARD

This handsome distinguished (ugly) fellow can be found at his famous haunts—the handball courts, General Hospital, Grey Cup train and infrequently in classes. Great competitor in all sports among other things—resulted in permananet evacuation from residence. Great oblitty to get along with people and will go far as an engineer. Future plans include Master Builders and post-graduate.

#### BRYAN WEIR

"HEINDRICK WIERCHUK". Member of engineers winning golf team. After 3 years with engineering top hockey team, hung up skates for "that other." Other sports are curling and drinking. Life membership to Fun Club and Zeta Psi Fraternity. Best pastime is bugging George. Famous saying: O.K. I'm coming early tomorrow. Famous wife saying: Bryan's sleeping. What party? Here! Future: Kelsey may have inside track.

#### DON W. WHITMORE

Neepawa Collegiate Grod. "Neep" is one of the quieter members of the class (except at footboll games), with an orderly mind and good business sense. Don's spore time is spent co-convening hockey, playing goal (like a sieve) for Senior A's, and beating a path to Portage on week-ends. Future—Business Administration of Western.

#### BOB ZIMMERMAN

Known to his intimates as "Normandy Zim". "Sig" Fraternity. Maintains a high scholastic standing and participates in all sports. Outstanding in handball, football and volleyball. Divides his coffee breaks between the Pembina and Assiniboine. Promising future in the structural field and wedding bells before too long.

The civil engineer's car pulled to a stop on a lonely road, far from town. The sweet young thing sitting next to him said, "I hope you're not going to try that 'out of gas' routine.

"No." he replied, "This is the hereafter routine."

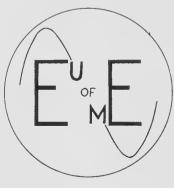
"What's that?"

"If you're not here after what I'm here after you'll be here after I'm gone."

# ELECTRICAL ENGINEERING



CLASS OF























#### RALPH ADAMS

One of the few family men in the class; being first on the class list, "Zoe" was made room rep. As a power man, Ralph will become a good bulb changer.

#### JOEL BLAIR

When Joel experiments smoke usually rises. His sense of humour has made many a trying moment pass easily; a hard worker, Joel will become a successful engineer.

#### NICK BOBEY

A graduate of Lord Selkirk High School where high marks gave him the Brewers' scholarship, Nick has kept his marks high while expanding his extra-curricular activities to include valleyball, track and girls. Summers he's spent in the Narthern Ontario muskeg "pipe-lining" haven't fazed him as far as his special side-line is concerned A communications man, plans are for post-grad. work.

#### DON BURDENY

Hailing from Ethelbert, Man., Don's main aim in life is a little home (????) — with whom he'll be taking the big step as soon as he has a job that'll help him support the girl. Side interests have been UMSU, Radio, and most anything with a tube or transistor in it.

#### JOHN E. CALLUM

Comes from Miami in the deep south (of Man.) Definitely a power man—"if there's more than 2 tubes it's 2 complicated." Interested in all sports, but avid curler. No special girl friend (at present). Future plans could include Education Faculty and teaching.

#### GRAHAM CAMPBELL

Chief debater of class. Former regular air force corporal, now in Auxiliary. Plays bagpipes. Immediate future with N.E. followed by Europe? Pastime — storing up useless information such as price of rice in China in July, 1842.

#### GUY CARLETON

Guy always has some sort of joke to start off the week. A resident of that mushrooming metropolis called St. James. Outside interests be in stereo., sports and nurses. Future—Back to U. of M. for post-graduate studies.

#### COLIN DELORY

His history includes an education in England and a large overturn of cars. He passes all exams on a one hour basis so that he gets his hourly coffee. When not occupied with an original design he will indulge in hi-fi music and chess or bridge. Succinctness is the password. For him a research career and a residence in a warmer climate are probables.

#### NORMAN DOWLING

Although not a market-gardener, Norm is a weekly distributor of "vegetables"; his efforts are always appreciated by competent associates. Without doubt, the future will involve activities conforming to the title of P. Eng.

#### ERNEST DUBNICOFF

The only fourth-year electrical engineer known to have studied for exams without the use of notes or texts; also famous for the ability to sleep while walking between classes. Besides being the leader of the ace group in Willy's lab, Ernie is a top bowler, curler, and card-shark.

#### ED ENNS

Ed, a devout pessimist, is a great advocate of the old saying, "Don't do today that which you can put off until tomorrow" Chess and swimming are two of his favorite pastimes, and he is quite expert in both. After graduation, Ed would like to stay in Manitoba if he can possibly arrange it.

#### DEREK EVANS

This fine young lad goes by the name of Joe. He must be a keen student because he commutes from E.K. in his little Morris every morning. An ex-navy man and a member of Sigma Phi Delta Fraternity. Probable future is working for a living?

#### TED EWASHKO

This optimistic young lad longs to become an ardent 40 beer electronics engineer. A perfectionist, Ted revises Myron's revision of Fred's lab reports. Immediate future—Post-graduate, lemon gin, and Joyce.

#### ABE FROESE

(Easy Abe.) A foreigner from East Kildonan. His main enemies are the Fort Garry Police who persist in making Abe late for classes 4 out of 5 days a week. (Abe is a stock car RACING fan.) His driving ambition is to build a car to break mach 1.

#### JAMES GILCHRIST

DMCI grad. Active member of Sigma Phi Delta. Spent his summers getting rich with Imperial Oil. Hobbies: writing labs, and flying helicopters. Future—Post-grad, work.

#### E. G. HILDEBRAND

St. Catherines native. Little Ed with the booming voice. "Multi-fun." 35 mm. fan (specializing in playboy portaits). Talks of building his hif-i set. Spent three summers with the Air Force and uses his authority to fly home for weekends. Future: Immediate—trip to Mexico; Eventual—no comment.

#### DOUG HILL

One of the class brains, is staying at Manitobo for post-graduate work. Won Isbister in third year. Doug plans on getting married if he doesn't win another scholarship, so he can maintain his standard of living. Hobby—Keeping track of Keith Ivey.

#### KEITH IVEY

The other class brain. Plans on taking post-graduate work in the east. Slogan—"East is east and the west is west and the twain met, darn it." Hobby—Keeping track of Doug Hill.

#### FRED KAITA

A reserved orduous intellectual, Fred insists on being a bachelor. He admixes T.V. with lab report writing, then wonders why we find errors in his work. Plans to continue studies in Business Administration.

#### GORDON KILGER

One of our RMC Groduates. Flew Sabres in Europe for three years before coming bock to finish his education and settle down with his wife and two children.





#### LEO LIFFMAN

Owner of most assorted collection of notes. Causes decibel level in lectures to be above average. Is fascinated by Civil and Mechanical Engineering, but "so what."

#### DON LOUGHEED

From The Pas; south of Snake Lake, Manitoba. Active in UMSU Radio and varsity curling. Main ambition concerns the weaker sex and is unmentionable. Future is a toss-up between post-grad. and a career in the communications field.

#### JACK MARADYN

A "Ham" from way back, Jack naturally took the communications option. Although he can easily be persuaded into going for coffee at almost any time, he is a conscientious worker and spends several evenings a week on campus studying. Jack hopes to remain in Winnipeg after graduation and work for the telephone system.

#### RICHARD MARANTZ

With the intent to devour, "Zot" fiercely attacks his assignments. Taking Electrical Engineering as a sideline; future lies in a wet cloud.

#### WILLIAM McLEOD

Bill "Missileman" McLeod hails from Kenora, Ont. Graduate of Royal Roads and Royal Military College. Sports are rifie team, volleyball and curling? Hobbies are his Hi-Fi set and M.G. Sports Car. Has a very special teacher from whom he takes extracurricular courses (evening's only). Future in Royal Canadian Artillery, probably dodging missiles.

#### WILLIAM H. C. MORRIS

A graduate in power. Chose electrical engineeing as a career while in elementary school. Bill's interest lies in the field of electrical design.

#### MYRON MUSICK

A bathroom baritone, Myron hopes to release his restrained desire to vocalize his virtual operatic talent. While listening to classicals and opera and wishing he had Robert Merrill stardom, he revises Fred's erroneous lab reports.

#### BILL O'NEILL

Hopes to clean up after graduation. He's going to work for Proctor & Gamble. Slogan: Have tongue — will argue. Married recently, so he can only argue away from home.

#### DON "PAT" PATERSON

Addict of Western T.V. shows, claims he's calibrating the T.V. set. Hi-Fi enthusiast and Radio Ham. Has worked for CPR and DRB and will be staying at Manitoba for Master's Degree. Chief concern—Relaxing.

#### BENGT PEDERSEN

A good sport and holder of a fine sense of humor, not to mention "the best tuba and bass player in town". His favorite hero is Wiley (re B.C.). Stuanch supporter of the Jan. 27 movement. Frequently found in the A.C. lab violently waving his hand and shouting furiously, "Vot's da Woltage?" RDG.

#### SYL PLANTE

A native of Flin Flon who spends his summers flying observer in jets. There is a suspicion amongst his friends that he does a lot more night flying than he admits. His entire life is devoted to finding the bottom of the glasses at the Pembina.

#### WALTER POTOLICKI

Has wife, will graduate. Wally married a girl who knew what was best for him. His professional interest is in the realm of Industrial control.

#### **GARRY ROLSTON**

A graduate of Lord Selkirk High School and Technical Chairman of UMSU Radio Committee in 1957-58. Garry has always been a radio man at heart, but has been known to condescend to do survey work for the City of St. James. Always tries valiantly to answer N. Bobey's questions. Keeps up to date on current affairs by reading Hansard and Playboy. Garry is an ardent admirer of U. of M. coeds and has a great knack for keeping company with certain of the said species.

#### EDWARD ROMANIUK

Our source of delight from deepest Home Street. Took Electrical Engineering soley for the benefit of mankind and advancement of engineering? He is truly a strange specimen since he has the tendency to work. His only other bad habit besides working is getting into "accidents". A fine fellow though, with a queer mistrust of "Scandinavians"?

#### A. L. "LARRY" ROSS

What's the "A" stand for? One of the old married men of the class. Former CPR electrician. Hobbies—Hi-Fi, provoking Bill O'Neill into arguments, and praying that his Stanley Steamer will keep running.

#### VINCE ROWE

Vince hails from Flin Flon, Manitoba. A man full of surprises Vince was married two months before anyone knew. He gave up Engineering in the last three months.

#### R. C. SALMON

This fish hails from Selkirk. He is a graduate of Royal Roads and Royal Military College. Interested in all sports especially water skiing with Selkirk Water Seals. Will make some girl a fine navigator, Future—Royal Canadian Navy.

#### ALLAN WATTS

Al's main hobby is ferrying lonely (young) girls from Winnipeg to Swan River for week-ends. Al comes from Swan River by the way. This is one beer man who fills his mug with a dark liquid called rum. His future is undecided.

#### JOHN WIEBE

Cheerful John is an ex-patriot of Daniel Mac., an active member of Sigma Phi Delta Fraternity and a Pembina Publican. John spent last summer in the Virden oil fields and plans a lucrative future with Sun Oil.

#### MELVIN G. WILLIAMS

Hecla, Man. Via Hecla High and first year Arts and Science to E.E. Hobby: Relaxing. Policy: To never worry about anything. Future—Communications?





#### LLOYD WONG

Electrical engineering's representative of the widespread clan of Wong. Studious, ambitious. Has an uncanny knack for finding the right formula — busy, busy, busy! Goes around between lectures with a happy smile mumbling "Pedersen, you're sick, Sick, SICK."

### Engineering Physics Graduates











#### ROBERT P. BUKATA

This brown-eyed boy wonder from Transcona originally came to Engineering via United College, and now comes via Volkswagen. A keen student, Bob has piled up a number of scholarships, among them three Isbisters. Activities - Tau Kappa Episilon Fraternity, beating Dr. Standil at golf, and listening to records - mostly his sister's Elvis Presley records. Immediate future-Post-grad, work in cosmic ray research in the Science Building cellar.

#### JERRY HATLELID

The curly-haired pride of Portage la Prairie came to Engineering from United College. His pleasing personality and jovial grin are apparent in all but the 8.30 classes. Academically he has won an Isbister. An ardent disciple of the Prophet Charlie Brown, Jerry has managed such activities as maintaining a Navy, university band, V.W., and a collection of "fantabulous" classical records. Future-Possibly!

#### HOWARD C. LEE

Originally from Canton, China, Howie has been living in Canada for several years now, and took his high school at Daniel Mac. During his University years he has been active in the Chinese Student's Association. He has spent a lot of time demonstrating labs and managed to knock down an Isbister scholarship. Future not definite, but possibly grad, work in applied physics.

#### R. GARY MARQUART

Gary was born in Winnipeg and matriculated at St. John's Tech. He leads an active extra-curricular life and still does very well academically. His interests at U. have been WOMEN, hi-fi, FEMALES, UMSU Radio, and GIRLS. At present he is busy with building a tape recorder and with women. Immediate plans-Maybe graduate work. Future plans-A sincere desire to reach the moon, women?

#### JOHN H. ORMROD

John is the only married physicist and seems quite contented with wife Peggy and recent addition Charlie. After leaving Viscount Alexander and two years of mining in Northern Manitoba, he settled down to Engineering. Even though he has been busy playing bridge and more recently changing diapers, John has received an endless list of honors, among them three Isbister scholarships, a California Standard and a General Motors scholarship. Future—Post-grad. work in physics here at Manitoba.

# GEOLOGICAL ENGINEERING







#### ROBERT JOHN FULTON

"Flosh"—the Boy from Birtle who made good. Never on idle moment. Interested in oll sports. Defensive stolwort on the Ankle Runners Hockey Club. Member of Residence House Committee and of the Geology Club. Survived four years of Residence food. Future—Post-graduate work and the Geological Survey of Conodo.

#### JOHN KLASSEN

"Jeep"—Cormon, Mon. Monoged to remain uncorrupted even ofter 4 years in engineering. Post experience as a banker. Drives a violent Vokswagen. Interests are symphony, J.V.C.F., Geology Club, AMUS, handboll and hackey. Future—Undecided.

#### D. BARRY MCKENNITT

"Ace" 4 G's B.M.O.C. By woy of Morden Collegiote ond United College. Very octive. Divides time between U.M.S.U., oll sports, study, and the "Operators Club". Member of Sigmo Phi Delto "Syndicate". Three time winner with Junior A hockey teams. U.M.S.U. Executive member, and Chairman of various committees during four years on U.M.S.U. Council. U. of M.'s Nfcus Seminor delegate. Musically inclined. Dingwall deboting finalist. Wan two scholarships. Future with Mobiloil in Colgary and Bonff.

#### RONALD MALCOLM MCKENZIE

"Diomond Ron" or "Rip"—Souris, Mon. Keener of the closs. Entered with G.M.C. scholorship; winner of Isbister in third yeor. One of the few members of the closs to overage twelve hours sleep a night. Member of the Geology Club, octive in sports especially hockey and boseboll. Future with Mobiloil in geophysics.

#### BERT TREICHEL

"The Dorlingford Driver". Cleoned up in the scholorship sweepstoke for 1958-59. President of the U. of M. Geology Club. Hondboll hero, soccer chomp and member of the U. of M. Intercollegiote Trock Teom. Known os the "impenetroble sieve" for the Ankle Runners. Frequently gets phone colls from his mother while of Fridoy Fun Club. Future—Unfinished business in New Brunswick.

### DEPARTMENT OF SCIENTIFIC CONFUSION

A report in The Chemical Digest published by Foster D. Snell, Inc. affers same cagent painters on how to make scientific reports more scientific Several methods are affered but the principles can be illustrated by a simple mathematical example.

"Every new engineer must learn early that it is never goad taste to designate the sum of two quantities in the farm:

$$1 + 1 = 2$$
 (1)

"Anyane who has made a study of advanced mathematics is aware that:

$$1 = \ln e$$

and that

$$1 = \sin^2 x + \cos^2 x$$

further:

$$2 = \sum_{n=0}^{\infty} \frac{1}{2^n}$$

Therefore eq. (1) can be expressed more scientifically in the form:

In 
$$e + (\sin^2 x + \cos^2 x) = \sum_{n=0}^{\infty} \frac{1}{2^n}$$
 (2)

This may be further simplified by use of the relations:

$$1 = \cosh y \sqrt{1 - \tanh^2 y}$$

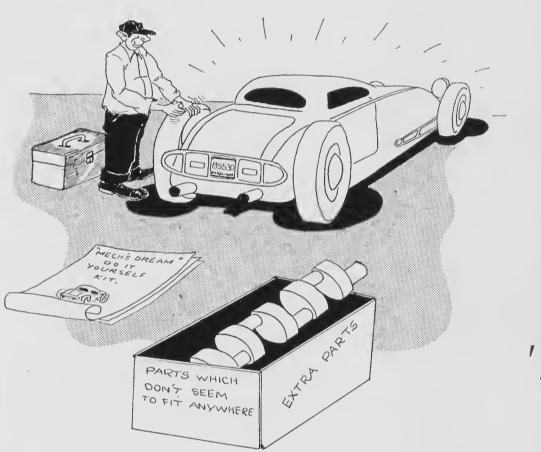
$$c = \lim_{z \to \infty} \left( 1 + \frac{1}{z} \right)^z$$

Eq. (2) may therefore be rewritten:

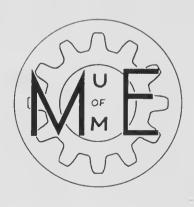
In 
$$\left[ \lim_{z \to \infty} \left( 1 + \frac{1}{z} \right)^z \right] + (\sin^2 x + \cos^2 x)$$
$$= \sum_{x \to \infty} \frac{\cosh y + 1 - \tanh^2 y}{2^x}$$
 (3)

"At this point it should be abvious that Eq. (3) is much clearer and mare easily understoad than Eq (1). Other methods of a similar nature could be used to clarify Eq (1) but these are easily discovered once the reader grasps the underlying principle."

# MECHANICAL ENGINEERING



CLASS OF





#### KEN A. BAILEY

"Ye olde seniore sticke." Has several ale-y-asses "K. B", "Kidney's Ken", "hands". Made his "mark' on Gr. III Dryden trip. Laxdal's partner in Quebec escapade. Zeta Psi active, outstanding in many fields, 1st yr. room rep., UMES sec.-treas., social chairman, 1.F.C. secretary, recipient of E.I.C. prize. Future—On his way to England.

#### DOUG BARBER

An inquiring mind which serves him well as a member of the Friday Fun Club. Prefers his '47 Chev to a '59 but manages to keep a well-filled black book in spite of this.

#### WES BERGMAN

HOMETOWN: Currently Winnipeg. But well-travelled in his 21 years.

COMMENTS: Wes is a very easy going fellow who is noted by his special bowl (pipe). Wes plays basketball for the Engineers and is well known for his Golfing. A member of the Phi Kappa Pi Fraternity, Wes shoud be outstanding in his sales future.

#### KEN BLOWATT

Brandon "Ken" is an allrounder in spite of all his extracurricular activities; pres. Men's Residence House Committee, Engineering Council, Class Rep., and girls. Manages to do well in studies. Hobbies: Bridge, reading, sports, beer and girls. Ambition: To become a millionaire; world tour. Future— Industrial sales, or own business.

#### EDMUND BOWKETT

Easily the biggest lad in the class. A future with the R.C.N. and already has an impressive command—the English language; amiable and amicable. His personality will serve him well.

#### LUCIEN CHARRIERE

Known as Lux, dislikes the employment office, staying single and G.M. products. Likes volleyball, Shawinigan Falls, Qué. Main ambition is to raise kids and get married. Future—plans to work where he can get a job—preferably in Qué.

#### DENNIS CHINFEN

Born in Jamaica. He had lived in China, India and Hong-kong before residing in Canada. He is a very quiet guy, but not so to his close friends. When he starts discussing any aspect of life he can spend hours and hours. He reads a lot about philosophy and history. Dennis is a very serious student (no fooling around); veteran resident of the Men's Residence; a good tennis player and one of the few Chinese students who speak English without Chinese accent. He wishes to stay in Canada. Good luck, Dennis!

#### FRANK CIEBIEN

Born, raised and educated in Winnipeg, the "quiet man" is the possessor of a keen wit and a dry sense of humour. A diligent student, Frank is one of the top men in the class, can always be counted on to have his assignments done—everyone is anxious to "cee" Frank. His hobbies include swimming, photography, shooting, dabbling in electronics and listening to Benny's troubles. Future plans undecided but a Jaguar 3.4 is a must.

#### MEL COOPER

Fugitive from Daniel Mac. and the Phi Kappa Pi Fraternity. Likes curling and hunting, has huge fleet of model planes and plans on a future in the aircraft industry.

#### MITCH CZAJA

"The original Cuban rebel", a Gordon Bell grad. who excels at curling and basketball, as well as being the best handball player on campus. A good man with the Slide Rule—in the beer parlor. Ambition: To have a life-time mistress—from Cuba. Future—Working with Livingston Wood Manufacturing Co. and touring eastern Canada and States with Tillsonburg basketball team.

#### NORMAN DASHEVSKY

"Big Norm" hails from Brunkild, is a good scholar and likes curling, bridge, Gail, and red corduroy shirts. Is presently at work on a revolutionary new transmission for his Dashmobile. Favorite expression: "Who's got a rubber?" Future—Plans to do research on applied free love.

#### ZYGMUND DOMARATZKI

From Ethelbert, "Jiggs" is one of the top men in the class and a true Forty-Beer man away from class. Enjoys basketball, volleyball and the opposite sex. Future is undecided but with his abilities, it will be bright and prosperous. Ambition: First G.M. president to own a Rolls-Royce.

#### G. BLAIR DYER

An "immigrant" Nova Scotian, Blair came to U. via Dartmouth High. Active member of Phi Delta Theta and keeper of the "little brown jug". Will start career with Imperial oil. A marriage contract with Kay will complete picture. Hungry member of "unholy four".

#### RALPH J. GAMBLE

Rivers, Man. Another married man whose luck with nickles changes them to dollars. Has definite proof that morning insomnia does not exist. Ambition: To be first in class. Future—undecided.

#### KEN GEDDES

A Lakehead boy who came to U. of M. via Lakehead Tech. Ken is an outstanding athlete and plays basketball for the engineers. He also participates in gymnastics, handball, and weight lifting, and is interested in a certain girl. Future—Undecided.

#### LES GERHARDT

Les, a Sask import, is owner of a new car (and wife). The "Doug Harvey" of the '59 Mechanicals plans a future in the West with his Sun Hemi. Being a shrewd businessman he will probably be the first in the class to make a million.

#### STEVE HARAPIAK

Another married member of the class, came originally from Cowan, Man. A sports lover, Steve plays baseball, hockey and is very adept at golf. He spent several years with Inco in Sudbury coaching a championship Juvenile baseball team. Future—With Eldorado Mining and Refining Co. in plant maintenance. Ambition: To own a Karmann-Ghia V.W.

#### D. HARSOKOESOEMO

One of the very likeable Colombo Plan students, from Indonesia ,studying at our university. Among his personal facets are: a fonaness for modern music, picture taking, collecting books and a lively interest in Canadian ways. To his classmates, Dar is a serious and intelligent student. Undoubtedly he will be the recipient of an extended scholarship for postgraduate studies if he so wishes. Dar, however, says that he has more pressing duties back home. He will upon graduation return home to a long neglected fiance and we hope a promising future with the Indonesian government.

#### DICK HERBERTSON

An outstanding athlete, has travelled extensively playing basketball and professional football. Strong advocate of free love—has had more deals than anyone else on campus—wonders if he will ever find the right girl. Spends Friday afternoons at the Pembina and Friday nights at the St. Regis. Was honored by being chosen as a corpuscle king candidate. Plans to work and play basketball in Tillsonburg after graduation.

#### JAMES G. HUTCHESON

The original E.K. Oxo. A Miles Macdonald and St. John's grad., Jim has spent his summers at Imperial Oil making gas. Active member of Phi Kappa Pi and excels in hunting, boating, playing his clarinet and singing. Future—Success with Imperial Oil.





#### PARMINDER SINGH JAWANDA

Other aliases include "Joe" and "Par". Joe landed in Canada armed with a B.A. degree from Punjab University, India. Despite the fact that fierce sikh blood courses through his veins he's a congenial and well liked guy, and when he's not getting a push for his Morris Minor, he's out hustling downtown girls. As president of ISO he has his choice! Favorite expression: "Residence girls, aghhh! Future — Industrial Tycoon in Punjab.

#### KARL KUBOW

"It all boils down to basic principles." A walking storehouse of knawledge on a variety of subjects, Karl is particularly "up" on thermo, berrylium, forgein cars and laboratory Chevengine. A native of Winnipeg, he came to Engineering via Science. An accomplished musician he once considered turning professional in this field. Other interests include swimming, shooting, technical literature and his car ("it's not a Ferrari but . . .") Future undecided but thirst for knowledge may lead to further study.

#### VICTOR LAMONTAGNE

Vic, the Mechanical's happy go lucky from Saskatchewan, imported from Queen's. Interested in sales because of the expense account and frequency of new cars. Intends to enjoy life for a while before contemplating matrimony. Activities: hunting, golfing, volleyball, Jazz Saciety (plays the sax but prefers the sexophone!).

#### JACK LANGE

Jack is earning his living at Moody and Moore while finishing off Power Plant Design. Last year's Senior UMSU rep., and a member of Sigma Phi Delta Fraternity.

#### WILLIAM LAPCHUK

Wild Bill is a Portage Lad. A cigarette he's never had His eyes are tubs, when you speak af pubs. Conscientiousness is one of his mottoes. Thus he shauld do well wherever he goes. Future—Undecided.

#### BRIAN K. LAXDAL

Always highly respected by his classmates. Brian has gone on from President of D.M.C.I. and Eaton's Junior Executive to the Tuxis and Older Boys Parliament, SEIC secretary-treasurer, SEIC chairman, delegate to E.I.C. Conference in Quebec City. Brian contemplates a future in Bus. Admin. at Western after a suitable rest in industry?

#### HARVEY G. MAZINKE

Good natured Harve hails from Sewell, Man. His main interests are sports (especially curling), studies, and women. Future—A certain nurse's husband. Work: What's thot?

#### DANIEL R. MOTYKA

"Dapper Danny" made it to Engineering by way of St. John's Tech and United College. He is active in footbal, hockey and volleyball. Hobbies include photography and chess. Sees a great future in marriage. His fovorite expression is: "Don't tell Ruthie."

#### FLOYD MULLIGAN

Originally comes from Rosser, Man. Went to United College before entering Engineering. Floyd is the "quiet" type, and often makes one wonder what his love life is really like. Main interests centre around curling, foatball, "a" girl, volleyball. Future—Undecided.

#### JACK NAWROCKI

Our Norwood representative. Jack participated in hockey, football and curling during his stay. A keen student, Jack could always be relied upon to have his assignments up to date. See Jack was our motto. Jack ended his tour of duty here by becoming a coke expert. His plans for the future are to go into business for himself. Knowing Jack, we are sure that he'll succeed.

#### ALLAN F. PEIRCE

Attended Norwood Collegiate and imparted on a career in Science before seeing the "light". Populor with his classmates and active in sports. Championship volleyball teom for two years despite handicap of height (6'-2"). Women and future—Yes!

#### GORDON PHILLIPS

Originally from Lauder, Man., Gordie's career has been diversified having worked for a rubber company, the C.P.R., been in the Army, worked on the farm, and taught school, etc.; all this before entering Engineering. He has a wife and two daughters; is assured of a brilliant career.

#### ALEX ROBERTSON

Shack-up artist of IV M, renowned curler, staunch supporter of Friday afternoon club. Still managed to find time to perform for Shapiro's Globermon Trotters. His ambition: To return to Norway to participate in nude midnite swimming parties.

#### CLIFF SHIRTLIFFE

Recently known as "Big Daddy", Cliff is one of the more conscientious men in the class. His interests are football, volley-ball and revising the 4th year mechanical engineering course. Cliff is married and the father of a son. Future—Possibly post-grad. work—should be a success whatever the venture may be.

#### WILLIAM SHULYK

"Wee Willy" came to us via Transcona High and United College. He is a member of Tau Kappa Epsilon. His interests cover a "broad" field. W. W. is known for his practical (?) jokes, but somehow has managed to stay alive. Bill's future is uncertain, but may include flying to the moon.

#### HARRY SHYMKO

Gimli's gift to Engineering. His motto, "All work and no play makes Harry a dull boy", explains his eagerness for wine, women and song. He also enjoys curling and cars. Harry's future is undecided but he has the talents to make it a bright one.

#### ROBERT R. SMEDLEY

Bob spent 5 years in the RCAF after groduoting from Kelvin. Active member of the University R.C.A.F. Squadron. One of the "active" married men of class. Can usually be seen with a "Satisfied Smile". The stable member of the "Unholy Four" in labs. Future in Aviation.

#### **BRONIUS STAPULIONIS**

An amiable person, born in Lithuania, has lived in Germany and Venezuela. He attended first and second years at the "Universidad Central de Venezuela". He landed in Manitoba in 1957. He is very interested in classical music and plays chess well. Someone to speak Spanish with.

#### TED SYPOSZ

This has certainly been a banner year for easy going Ted. When not organizing and attending parties he was recovering from them. Although very active in clubs and community work, Ted still found time to play for the Globerman Trotters and attend SOME classes.

#### K. TITTLER

The fighting redhead of the mechanical class and wounded member of the Shapiro Globermon Trotters. An active man in sports, Kon is associated with the Warrior organization. A charmer by nature he should do well in the sales field.





#### DAN TORBIAK

Hails from Poplarfied (north of here). Dan holds the distinction of being the first one in class to receive a job offer. His extra-curricular activities include handball, his heir, and brewery visits on Fridays. He is also a member of "Shapiro's Globerman's Trotters", this year's scourge of the Volleyball courts. Future lies with Imperial Oil.

#### DOUG WHALLEY

Debating ond public speaking fan. Stalwart UMES Council member throughout student daze. Married and expects a small Sigma Phi Delta member in July. Plans to raise said addition in Flin Flon, Man.

#### HARRY R. WILCOX

U.M.S.U. Harry. Daniel grad. Spent summers at T.C.A. refueling planes. Hasn't found out yet what time the first period starts. Has never asked a question in class but says he will on the last class of the last day.

#### M. M. WIRJOSAPUTRO

His name is Mohamad Mochtar Wirjosaputro, but he will smile friendly when called Moch. He had studied of the University in Indonesia and came to Manifoba in 1957. Moch is a serious listener of classic music and likes to play chess and tennis in his spore time. After graduation his plans are to return home where his parents, old friends and a job are waiting for him.

#### GRENVILLE YUILL

D.M.C.I. grad. Another member of the Sigma Phi Delta Fraternity. Gren is one of the top Missilemen of Rm. 319. "Moo Moo loves————". Gren is also editor of the Slide Rule. Ambition: To get a high salary position in Winnipeg. Probable Destination: Britain.

### CONGRATULATIONS

Kenneth Bailey — Grenville Juill Athlone Fellows, 1959

# The Candid Camera In the Mechanical Lab.

Five Place Accurocy.

Scholar.

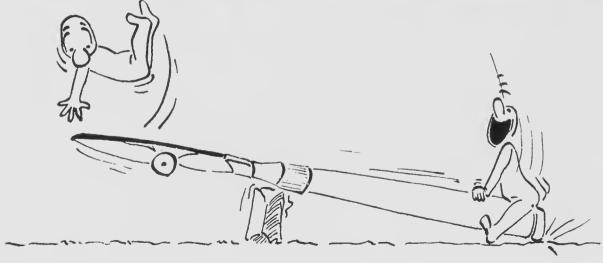
He should have been a Civil!



Candid Shot.

Itchy!

Find the grinder.



### THE PHOTOGRAPHER

# "What socialized medicine could lead to in Winnipeg"

A One-Act Play for three performers

Wife: Well, it's came dear, our 5th anniversary and no children. If only I had known

they would pass a law like that.
Hubby: Yes, there is no way around it either. Ive read and reread and can't make it read any different. There it is . . . IN VIEW OF THE FACT OF THE FALLING BIRTH RATE IS COMPULSORY FOR MARRIED COUPLES TO HAVE AT LEAST ONE CHILD WITHIN FIVE YEARS OF MARRIED LIFE-FAILURE TO COMPLY WITH THIS ACT WILL ENTAIL THE SERVICE OF A GOVERN-MENT AGENT BEING CALLED IN TO ASSIST.

Wife: Oh, dear, I suppose the man from the ministry of births will be here today.

Hubby: I suppose. Well, I'd better be off to wark (Exit Hubby) (knock on daar - wife answers).

Wife: Oh, I suppose yau are the man

from . . .

Man: Gaad marning, I've came ta . . . Wife: Yes, I knaw, will you excuse me for a moment? (Exit).

Man: (ta himself) I suppose this is the right address, I dan't see why these proud mothers can't bring their babies to the studio ta be phatographed — still she appears to be expecting me so I suppose it's O.K.

Wife: (Re-entering) will you not sit down Mr. . . .?

Man: Janes is the name. I suppose your husband is agreeable to this?

Wife: We both think it is for the best, considering he can't do it by himself.

Man: Yes, a professional touch is really necessary for the perfect results. Well, I might as well get busy. Might I suggest ane on the sofa, one on the mat, one on the bed and one in the bath?

Wife: Good heavens! I didn't think so many would be necessary!

Man: Well madam, the best of us can't get a gaod ane every time but one out of five is bound to take.

Wife: Forgive me. It does seem a little informal daesn't it?

Man: The charm of the thing is in the informality. Would you like to see some examples af my work? (Praduces pictures). Now laok at this baby; took me four hours ta get him, but isn't he a beauty?

Wife: Yes a lavely child to be sure.

Man: And loak at this one, it was a tough assignment, dane on a pony and in one shot

Wife: Good Heavens, on a pony!

Man: Yes, it's not really difficult after some practice and I do get a kick out af my work. Here is one I did in Eaton's.

Wife: Eaton's! Well, that daes seem a little public.

Man: Yes. The mother was an actress and wanted publicity; this one was my toughest assignment, (shaws picture). I did this up in City Park one snowy afternoon, took me from two till five o'clock; warst conditions I've ever worker under.

Wife: (Weakly) City Park? . . . but God,

Man: Yes, it was some jab, people crawding around four and five deep just to get a laok at me on the jab.

Wife: Oh, No!

Man: Yes, if it had not been for one of the squirrels nibbling at my equipment, I could have had another shot. Now madam, will you kindly help me get the tripod erected?

Wife: (Weakly) Tr . . . Tr . . . Tripod!

Man: Yes, I use a three foot stand for . . . well what do yau know, she's fainted!!!

Beer...

Where ore they? . . . . .

Here.









The Source.

Will you look at it all!

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# At the Pep Rally

Cheerleaders practice . . . .

and perform.

Guess who.



at the opera.

Leas



Whot marks is he getting at callege? He got a good ane — aver his left eye where a whiskey battle hit him.

A '59 graduote oppeared ot a foctory and soid he understoad there was o supervisory position open. The personnel manager looked him over—"I might be inclined to give you a triol if I thought you could handle the work."

"Wark," gosped the grad. "I thought you were looking for a supervisor."

1st Co-ed—''Has your engineer ever spoken af morriage?''

2nd Co-ed—"Well, indirectly." 1st Ca-ed—"Indirectly? How is that?"

2nd Co-ed—"Once he said he hod never smoked o pipe because he never could try one out before he bought it."

The local painter was exhibiting some of his wark when on inquisitive motron osked-Tell me, do you do anything in the nude?"
"Well, modam," replied the artist thought-

fully, "occosionally I toke o bath."

He—"Going to have dinner anywhere to-night?"

She (eogerly)—"Why, no; not that I know of."

He—"Gee, you'll be awfully hungry by morning."

Sign in factory: "Girls with sweoters too large far them-Watch out for the engines. Girls tao lorge for their sweaters—Watch out far the engineers."

# The curriculum

Tell me more.

Pick the profs.



Bernoulli and Friends.

The watchers.



From the back . . . . . . . . . . . . . . . and the front.

Page Eighty-one

## In the Civil Lab.

Gambling is not allowed.

Thank God it's aver.

The boys.







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Coffee time.



Laura's tired.

"Your son is an undertaker? You said before he was a doctor."

"No, no, I said he followed the medical pro-

fession."

"Good morning, nurse," said the doctor,

"and how is the sick engineer?"

"I think he's improving," was the reply, "he tried to blow the foam off his medicine this morning."



Being a bachelor is a lot better than being a bachelor's son. Hence we should all get our Masters before we get married.

"Get this," the husband chuckled. "That ridiculous janitor of ours claims he made love to every woman in the building except one."

"Hmmmm," said his wife, assuming a thoughtful far away expression, "must be that stuck-up Mrs. Frobisher on the fourth floor."

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Winnipeg 3, Man.

Divisional Office—REGINA

Joe sat at his dying wife's bedside. Her voice was little more than a whisper.

"Joe, darling," she breathed, "I've a confession to make before I go . . . I . . . I'm the one who took the \$10,000 from your safe . . . I spent it on a fling with your best friend, Charles. And it was I who forced your mistress to leave you. And I'm the one who reported your income tax evasion to the government . . ."

"That's all right, dearest, don't give it a second thought," answered Joe. "I'm the one who poisoned you."

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